

AMERICAN ARTISAN

FEBRUARY, 1945

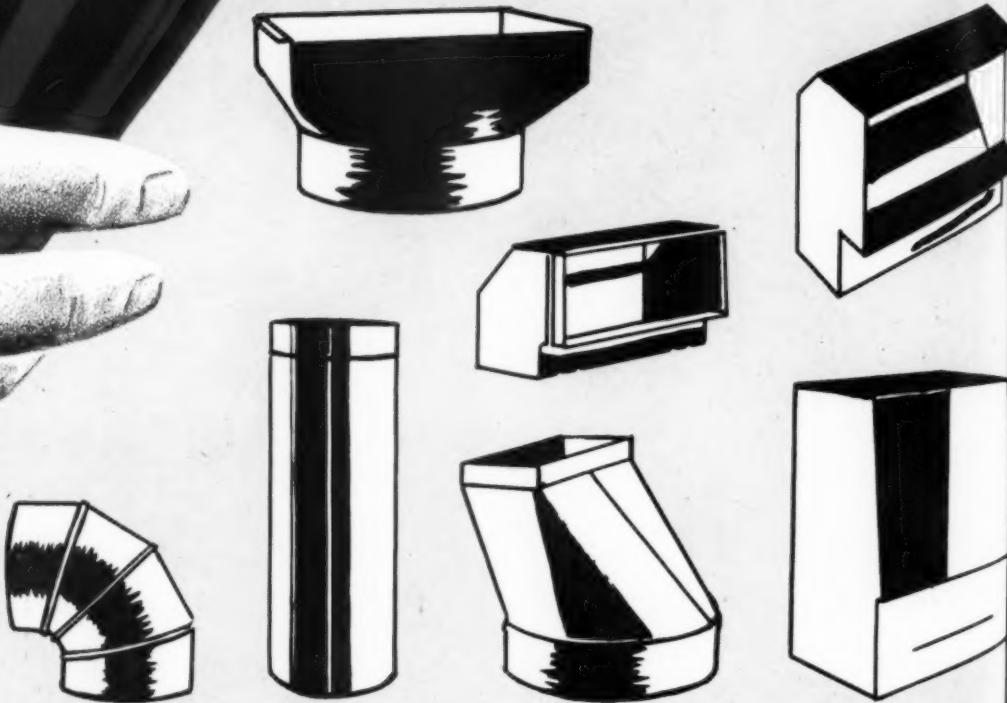
Permissible Business Tax Deductions - - - - -
How to Figure Heat Losses Under New Winter A. C. Manual - - - - -
Found — The Cause of Box Gutter Failure - - - - -

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Lamneck

QUALITY HAS
NOT CHANGED



ALTHOUGH we're still geared to meet Uncle Sam's war needs—Lamneck Furnace Pipe and Fittings are of the same good quality as before.

It's true, we are not making every fitting in the book, but we are fabricating every item, essential to the dealer, to help keep the home furnace fires burning.

Lamneck Jobbers have been patient and it is our hope that soon they will have all the goods they need to meet the dealers' requirements, but in the

meantime, let's win the peace and remember for quality furnace pipe and fittings, it's Lamneck—always.

P.S. For the name of your nearest Lamneck Jobber and new LAMNECK ILLUSTRATED PRICE SHEET, just drop us a postal card today.
LAMNECK PRODUCTS, INC., Middletown, Ohio.



**LAMNECK
PRODUCTS**



usAIRco

Keeps Temperatures Uniform and the Air Fresh!

THIS huge swimming pool is serving an important phase of a young trainees program at a military training base. It is one example of the many big jobs where usAIRco equipment is meeting the requirements of the military services.

The vast cubage of this structure is heated and ventilated by usAIRco equipment. usAIRco Supply Blowers, Heat Coils, Unit Heaters and Exhaust Fans keep temperatures uniform and the air fresh.

usAIRco air conditioning equipment has established a consistently high record of performance and dependability in important industrial, military and maritime applications.

Start your postwar planning now.

Whenever you need the blowers, washers, coils, deflato grilles, unit and blast heaters, specify usAIRco. Inquiries receive prompt and interested attention. There is a usAIRco representative to serve you.

UNITED STATES AIR CONDITIONING CORPORATION

NORTHWESTERN TERMINAL • MINNEAPOLIS, MINNESOTA

BLOWERS • COILS • COOLING SYSTEMS • FANS



EXHAUSTERS • HEATERS • WASHERS • WHEELS

AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES
SHEET METALS

AND

Warm-Air
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 114, No. 2 February, 1945 Founded 1880

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In This Issue

If you are getting ready to file your business tax report, you may find some items in Arthur Robert's article (page 46) on permissible Business Tax Deductions which you have overlooked. Every one of these items is deductible—with taxes as high as they are now, don't forget any deduction which is legitimate.

Arnold Kruckman has reported many important and interesting developments from Washington, but none has been more startling than his analysis (page 48) of the much discussed Presidents message and budget. This, says Mr. Kruckman, is a "nation's budget"—your budget and a blueprint for your business. Called by some—"Compensatory Economy" it is, in our language, another version of "Planned Economy". It may be rule with a velvet glove, but if you want no part of such a program, read—and then tell your congressman why you object.

If your business is heating, you have read or heard about the proposed national advertising program of the NWAH&AC Ass'n—on page 53 is a brief summary of the program plus a report of the Executive Committee meeting in Cleveland and the first suggested steps toward a strong dealer division.

We are launching a new Code and Manual for the Design and Installation of Winter Air Conditioning Systems. It is hoped this new code will be the code used by everybody. Professor Konzo, on page 59, explains how to calculate heat losses using the new code. Later articles will explain the How, What and Why of the Code—begin now and keep abreast of the explanation.

If you ever had a box gutter fail—and couldn't figure out why—page 77 will tell you why and what to do about it.

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COAL GRAVITY OIL FORCED AIR GAS
MODERN STEEL FURNACES

You Can't Beat Five of a Kind!
...if they're all

SYNCHROMATIC



Nor Can You Beat This:--

- ... Exceptional Fuel Saving
- ... Clean, Smooth Beauty
- ... Remarkable Operating Ease
- ... Engineering You Can SELL
- ... Truly Post War!

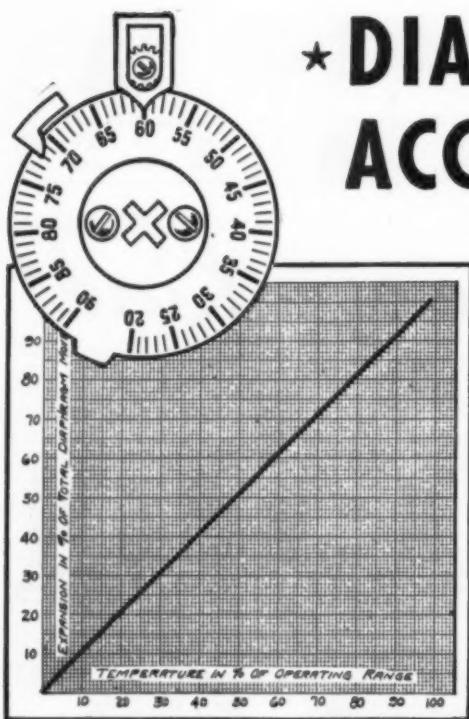
•
The World's Finest Line—

Quality for your customer at NO EXTRA COST! See your jobber. Guard your future with a real line of furnaces with Merchandising Wallop!



THE
STANDARD
FORCED AIR
MODEL

SYNCHROMATIC CORPORATION
5110 NORTH THIRTY-FIFTH ST., MILWAUKEE 9, WISCONSIN



*DIALS are *EVENLY* and ACCURATELY CALIBRATED OVER THEIR ENTIRE RANGE BECAUSE OF THE STRAIGHT-LINE EXPANSION OF HYDRAULIC-ACTION

With each degree of temperature, the expansion and contraction of the solid-liquid charge of Hydraulic-Action is exactly the same. That is the reason why the dials on all White-Rodgers Hydraulic-Action controls are *evenly* calibrated—and always are accurate over their *entire* range.

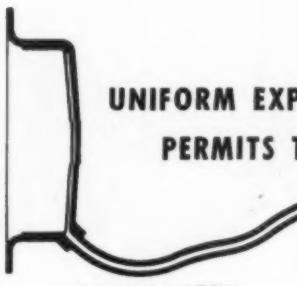
8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
- ★ 6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

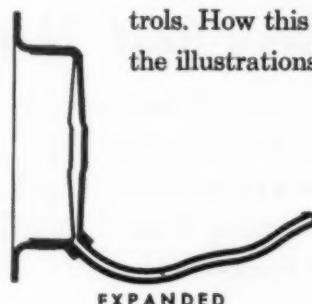


UNIFORM EXPANSION OF HYDRAULIC-ACTION PERMITS TROUBLE-FREE INSTALLATION

No going back to adjust or recalibrate when you equip with White-Rodgers Hydraulic-Action controls. How this works is shown in the illustrations below.



Above is a cross section of the diaphragm and part of the liquid-filled capillary. In this view the liquid has contracted, releasing the pressure on the diaphragm and causing the switch contacts to function.



In this cross-sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.



Actual-size illustration of the White-Rodgers diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.

WHITE-RODGERS ELECTRIC CO.

1215B CASS AVENUE

ST. LOUIS 6, MISSOURI

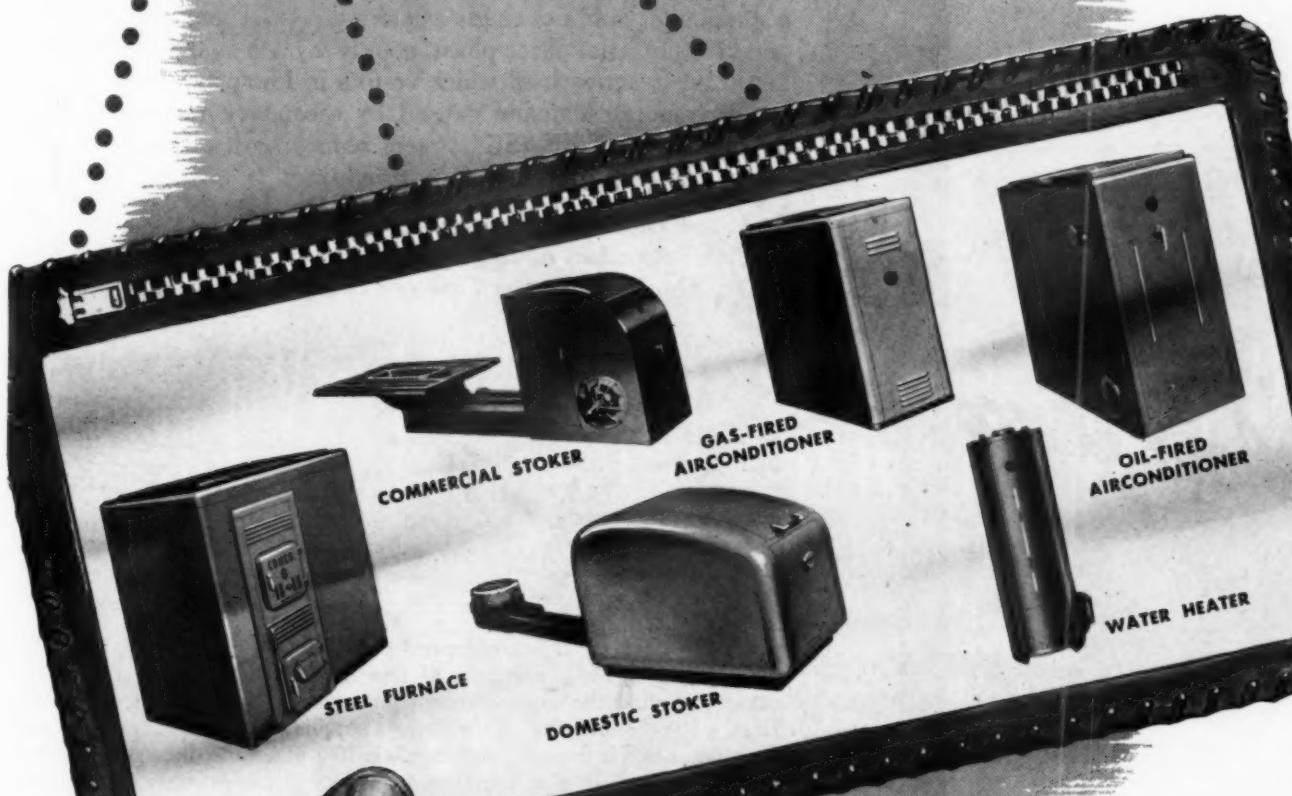
Controls for Refrigeration • Heating • Air-Conditioning





CONCO UNITS TURN INTO CASH *Quicker*

The CONCO line is not only complete, to provide full market coverage. It is also designed right, to sell and to stay sold. A few territories are still open for sales-minded distributors and dealers. Write today for the full story on the CONCO line. CONCO is the name with a future, for you!



PRODUCTS OF CONCO *Research*

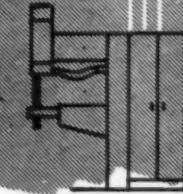
CONCO is a name you can build on. A program of intelligent, far-sighted research assures you of a heating line that will always keep a step ahead of the parade. Our research is insurance we take out on yours and our own future.

CONCO ENGINEERING WORKS

MENDOTA, ILLINOIS



"THREE-PHASE"



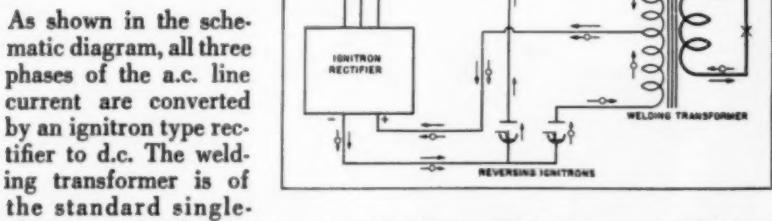
resistance welding

what it means

Spot, seam or flash welding steel in heavy gauges can now be accomplished on a balanced three phase load. This revolutionary achievement in power efficiency overcomes many limitations encountered with a.c. single phase welders. These are: disturbance to the usual three-phase supply by the unbalanced load, the heavy reactive load which results in low power factor, and the high power demand caused by secondary resistance. The Sciaky "THREE-PHASE" system *reduces cost of power installation and cost of operation* by providing:

1. *A balanced three-phase load*
2. *Operation at near unity power factor (less KVA)*
3. *Decreased actual power demand (less KW)*

how it operates



As shown in the schematic diagram, all three phases of the a.c. line current are converted by an ignitron type rectifier to d.c. The welding transformer is of the standard single-phase type, but has a center-tapped primary. The d.c. current is fed to the primary through a system of two ignitron tubes which fire alternately and allow the current to flow through only one winding at a time. Thus, while the direction of the current supplied by the rectifier is always the same, since it flows in only one winding at a time during successive impulses, *it will flow in opposite directions in the primary*. Therefore, the induced welding current in the secondary is a continuous alternating impulse of low frequency . . . of ideal wave shape and magnitude.

send for booklet

Bulletin 204-A describing fully the operation of the Sciaky "THREE PHASE" will be gladly sent on request.

SCIAKY **BROS.**

Manufacturers of a Complete Line of AC and DC Electric Resistance Welding Machines
4915 West 67th Street

Chicago 38, Illinois

Offices in Detroit, Los Angeles, Washington, Cleveland and New York

Representatives in Principal Cities

In England: Sciaky Electric Welding Machines, Ltd., London

In France: Sciaky S. A., 13, 15 Rue Charles Fournier, Paris



BEAUTY IS NOT SKIN DEEP



"The Sun Never Sets with MOR-SUN!"

The MOR-SUN casing
will be a thing of beauty . . .
Created by a leading industrial artist . . .
Its flowing lines and soft, lustrous finish
will give it unmatched eye appeal,
but its beauty is not skin deep . . .
That handsome casing, die pressed for rigidity,
encloses a rugged, efficient
PRESSED STEEL heat-exchanger!
Designed to exacting standards,
it will be *Mass Precision Produced*
on modern equipment!
BEAUTY and UTILITY . . .
a combination to insure
satisfied purchasers . . .
MOR-SUN is worth waiting for.

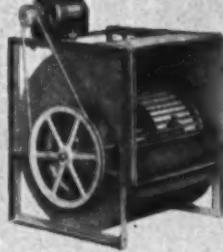
MORRISON STEFFI PRODUCTS, Inc. Buffalo 7, N.Y.

UTILITY Appliance Corp.

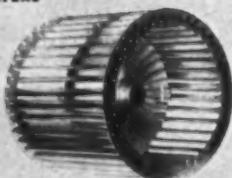
Air Cooling, Ventilating and
Gas-Fired Heating Equipment



AIR COOLERS



STANDARD
BLOWERS



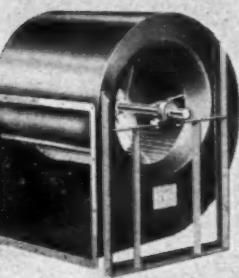
BLOWER WHEELS

The Utility Factory...more than
five acres of plant floor space

UTILITY

You are invited to investigate the complete line of Utility evaporative air coolers, centrifugal blowers, propeller fans, floor furnaces, circulating heaters, unit heaters and forced air furnaces. Catalogs and illustrated literature will show you the outstanding features of these truly modern appliances.

Utility coolers, blowers and fans are now available under WPB regulations and priorities. Heating equipment will be available when war restrictions are lifted to permit manufacture.



HEAVY DUTY
BLOWERS

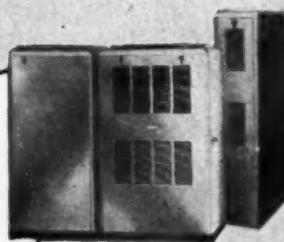


FLOOR FURNACE

EXHAUSTERS



UNIT HEATERS



FORCED-AIR
FURNACES



PROPELLER FANS



CIRCULATING
HEATER



UTILITY Appliance Corp.

Formerly Utility Fan Corporation

4851 South Alameda Street, Los Angeles 11, California

FORMULA FOR LONGER SHEET METAL LIFE

Fe



It Begins with the Iron in Toncan Iron

... and produces the Highest Rust-Resistance of any Ferrous Material in its Price Class

Fe, the symbol for Iron, is the beginning of a proved formula for longer sheet metal life. And it is the first of many reasons why Toncan Iron has the highest rust-resistance of all ferrous materials in its price class.

Toncan Iron is made from an open-hearth iron that is refined to an exceptionally high degree of purity. Thus, chemical impurities and non-uniform grain structure, which in-

vite corrosion, have been reduced to a minimum.

Besides that, Toncan Iron is an alloy. To the refined open-hearth iron is added twice as much copper as found in copper-bearing steel. It also contains molybdenum—added to make the copper more effective.

You'll like Toncan Iron, too, because its rust-resistance is uniform—all through the metal. And be-

cause Toncan Iron is a refined iron and carefully processed for ductility, it is one of the easiest materials to fabricate by all methods.

So, whenever your requirements call for a material of high rust-resistance, remember the longer service and lower fabricating costs of Toncan Copper Molybdenum Iron.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Get the full story about the profit-making, business-building possibilities of Toncan Iron in Booklet No. 410, "How Toncan Iron makes Money for Sheet Metal Contractors and Fabricators."

Republic
TONCAN COPPER MOLYBDENUM **IRON**

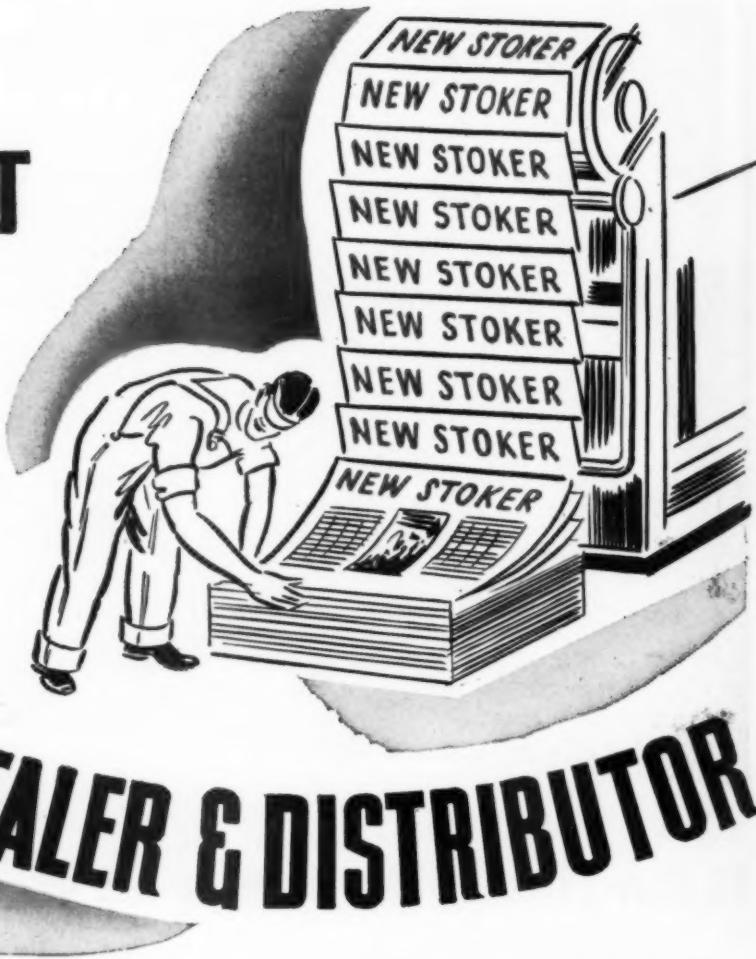


—for drains, gutters, conductor pipes, roofing, siding, tanks, ventilators, skylights, roofs, and other rust-resisting sheet metal applications.

IMPORTANT *News*

FOR EVERY

STOKER DEALER & DISTRIBUTOR



HERE'S the big news for which thoughtful dealers and distributors have waited. There's a great *new* opportunity in the stoker field. There's a *new*, soundly engineered bituminous stoker that will give you a decisive competitive edge in *both* quality and price. Now is the time to become a part of this new stoker opportunity. Now is the time to get set for automatic heating's fastest-growing, fastest-moving market. Be ready when wartime manufacturing restrictions are lifted. Be ready when stokers start coming off our lines to meet the unprecedented demand that will center on automatic stokers. Models (11 of them) to give you complete market coverage . . . Prices that are *right*—for profits and sales . . . Plans that dealers and distributors themselves are going to help shape.

*Unconditionally guaranteed against defective workmanship
and materials for 2 years.*

Please address Dept. B-1.

STOKER DIVISION

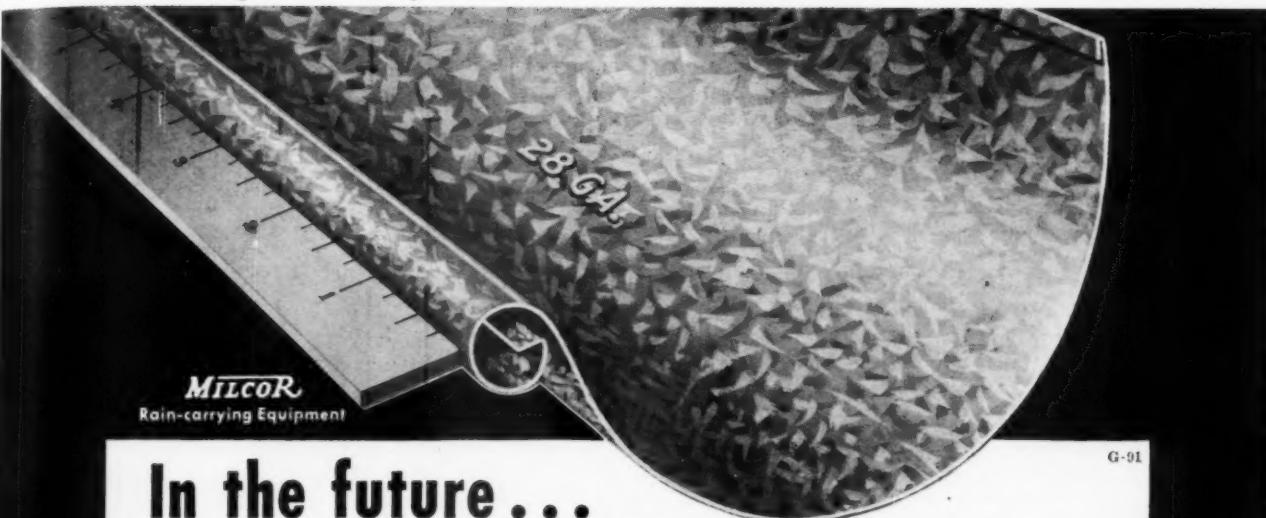
MAPLE CITY STAMPING COMPANY

ESTABLISHED 1904

700 PARK AVENUE

PEORIA 3

ILLINOIS



MILCOR
Rain-carrying Equipment

G-91

In the future... You can again enjoy success with **MILCOR**

A complete line of sheet metal products that help you deliver good-looking, safe, satisfactory jobs that build your reputation as a capable craftsman.

MILCOR STEEL COMPANY
MILWAUKEE 4, WISCONSIN

Chicago 9, Ill. • Kansas City 8, Mo.
Rochester 9, N. Y. • Los Angeles 44, Calif.
Baltimore 24, Md.



... equipped to serve
you better through
acquisition of

THE J. M. & L. A.
OSBORN CO.
CLEVELAND 14, OHIO
DETROIT 2 • BUFFALO 11 • CINCINNATI 25

as a *Milcor* subsidiary

You can count on getting post-war deliveries fast — to Milcor's convenient in-stock delivery points are added Osborn's strategically-located branches.

For help in winning greater success in the sheet metal business, look to Milcor and Osborn.

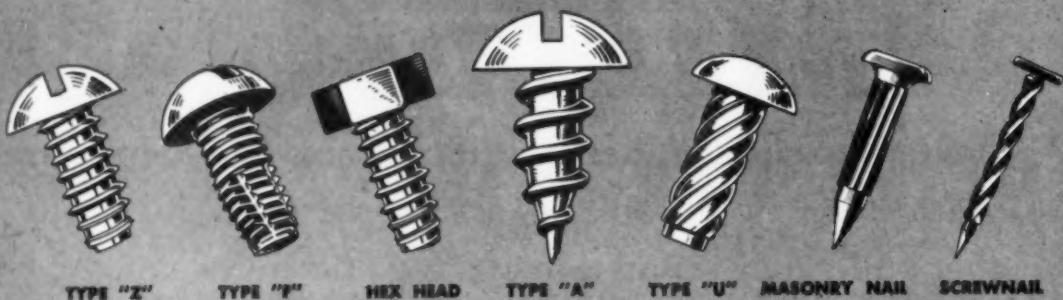
MILCOR
Furnace Pipe and Fittings

NO ONE STYLE HAT SUITS ALL HEADS . . .



NO ONE TYPE P-K FASTENING DEVICE SUITS ALL NEEDS

Know all **SEVEN** . . . and use them



for Speed and Savings on Sheet Metal Work

YOU KNOW the Type "A" Parker-Kalon Sheet Metal Screw. It saves thousands of man-hours for sheet metal men everywhere—time formerly used up in awkward bolting and riveting.

YOU'RE MISSING OUT on important additional time and labor savings, however, unless you know, and use, the six other types of P-K Fastening Devices shown above. They are especially adaptable to the many kinds of fabricating jobs going through sheet metal shops today.

Get your copy of the P-K
"USERS' GUIDE"

It's a handy "family album" of all the P-K Self-tapping Screws, showing which type to use for fastening different kinds and thicknesses of materials, and how to do the job. It is file size, and fitted with a wall hanger. We'll send a copy at your request.



USERS SAY, in hundreds of enthusiastic letters—"We would be at a tremendous disadvantage without P-K Screws . . . They save many times their cost on any installation . . . They add strength and dependability that wins repeat business . . . We have used them for 25 years, and never yet have found their equal."

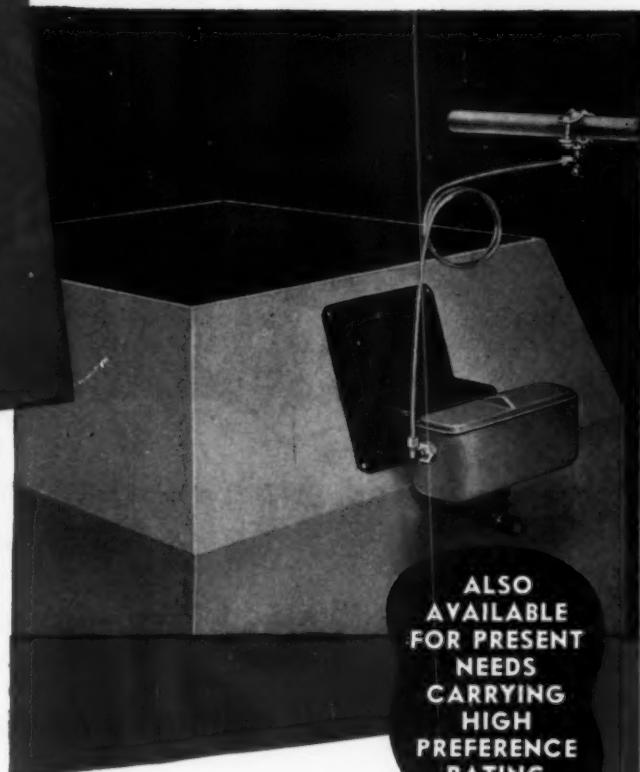
TELL US what you want to fasten and we'll send samples of the correct type of screw . . . free. Parker-Kalon Corp., 208 Varick Street, New York 14, New York.

PARKER-KALON

Quality-
Controlled Sheet Metal Screws

Your Post-War Plans Are Already Made

. . . When it comes to Humidifier Water Control



No. 517, consisting of No. 417
Float Valve with rugged die
cast float chamber and cover.



No. 417 Snap Action Float
Valve for installation in hu-
midifier pan or float chamber.

MCDONNELL & MILLER
1318 Wrigley Building, Chicago 11, Illinois
Doing One  Thing Well

Climatrol

BY MUELLER

STANDS
FOR

True Indoor Comfort



... a key factor in the post-war success of your business

Comfort depends primarily on conditioning of air—in these 6 ways:

1. Temperature control.
2. Humidity control.
3. Proper movement of air.
4. Introduction of fresh air.
5. Removal of dust, pollen, and other foreign matter.
6. Removal of bacteria conveyed on dust.

Securing these benefits depends on *installing a system that is basically designed to handle and condition air.*

Above all, it is important to *start right* — with a system that takes your customer as far as possible along the road to true indoor comfort. That means a *Mueller Climatrol system*. Then he may later add more of these improvements as they become available or as they fit into his budget—and buy them from you.

Today, standards of indoor comfort are higher. It pays to sell architects and builders

in your community on giving this matter No. 1 priority in the post-war building budget and allocating a sufficient part to achieve this result.

Start planning now. Get complete facts on the 88-year performance record behind Climatrol equipment—your assurance of efficiency, economy, and the utmost in indoor comfort. Then make your decision to concentrate on the most complete line on the market . . . including exactly the right equipment for your needs.

Member



Units specially designed
for the chosen fuel . . .
gas, oil, or coal

Equipment for
homes of every
size, type, and
price range — old
or new.



D-48

[Tear out this coupon and mail today!]

L. J. MUELLER FURNACE CO., 2010 W. Oklahoma Ave., Milwaukee 7, Wis.
Please send me literature describing furnaces and winter air conditioners for:

Gas Oil Coal

I am interested in the proposition for my territory as a distributor dealer

Name.....

Firm.....

Address.....

City.....

() State.....

Meet your Future Customers



• There's Mister A, the "show me" type . . . Mister B, out to get "something extra" for his money . . . and Mister C, with a sharp eye for flaws.

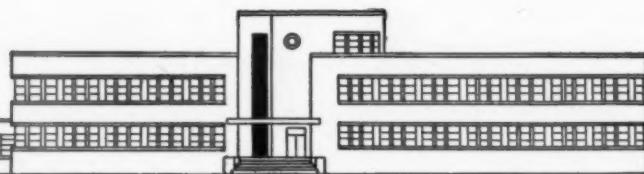
Fussy? Sure they're fussy . . . but they're typical of your future customers. All this time that they've been getting by with old heating equipment—"making it do" or doing without—they've looked to the day when they'd have the best. And they mean to get it.

Manufacturers of heating equipment, eyeing this critical audience, are consulting with PENN in increasing numbers . . . seeking automatic controls to give their products added efficiency, protection and ease of operation. And PENN engineers are

responding with controls tailored to specific needs . . . controls that become a *part of their product*, indispensable to top performance.

For dealers and service men, this means fewer troubles from adapted accessories . . . less troublesome repairs. No matter how tough the buyers, *co-operative design* points a sure way to customer satisfaction. Let it work for you in the days to come. Heating equipment with PENN automatic controls shows care and consideration for you on the part of the manufacturer. *Penn Electric Switch Co., Goshen, Ind.* Export Division: 13 E. 40th St., New York 16, U. S. A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

Gar Wood

Rationing Proves Gar Wood Efficiency



These homes average seven years in use. They contain an average of 7.6 rooms and 2.3 baths and sold for \$10,000 to \$20,000.

INVESTIGATE THE GAR WOOD FRANCHISE IN YOUR COMMUNITY

Gar Wood Prewar Heating Equipment



OIL-FIRED
Tempered-Aire



OIL-FIRED
Boiler-Burner Unit



GAS-FIRED
Tempered-Aire

Gar Wood

HEATING DIVISION

GAR WOOD INDUSTRIES, INC.
DETROIT 11, MICHIGAN



PIONEER TEMPERATURE CONTROL EQUIPMENT FOR ANY SOLID FUEL HEATING PLANT

THE EASE with which you can provide all the comforts and conveniences of automatic control is a revelation to most home owners.

There are just three basic parts to the Pioneer System: thermostat, electric damper motor, and transformer.*

Every home will want this simple and dependable equipment as soon as it is understood that it will bring these advantages at little cost: (1) Conveni-

ence; (2) Comfort; (3) Continuous savings—will soon pay for itself; (4) Lasting satisfaction. Write today for details . . . and get your share of available production.

The little red light on the thermostat tells when it is calling for heat and has opened the damper.

PIONEER

THE MASTER ELECTRIC CO.
AIRCRAFT AND ELECTRICAL CONTROLS DIVISION
DAYTON 1, OHIO



*Various types of safety limit control and time switches are available if desired.

There's a Story of *Sales* Behind This Trademark!

AFTER THE WAR,
RUDY WILL BE
READY WITH AN
EVEN FINER LINE
INCLUDING

FORCED AIR HEATING EQUIPMENT
Coal Fired • Gas Fired • Oil Fired

GRAVITY HEATING EQUIPMENT
Coal Fired • Gas Fired • Oil Fired

BLOWERS

OIL BURNERS

HUMIDIFIERS

STOKERS

WATER HEATERS

HEATING ACCESSORIES



Heating men who realize the value of customer satisfaction know that nothing sells so well as the product championed by a prospect's neighbor or friend. Rudy's sincere desire to give home-owners the finest equipment that skilled workmen, experienced engineers and tested materials can create has been the basis for such satisfaction for 30 years. That is why hundreds of furnace men are finding the Rudy name increasingly helpful in promoting lasting sales in their communities.

Coal, oil and gas furnaces and blowers are now available in limited quantities for essential requirements. Write today for full details on Rudy's wartime line and postwar plans for your community.



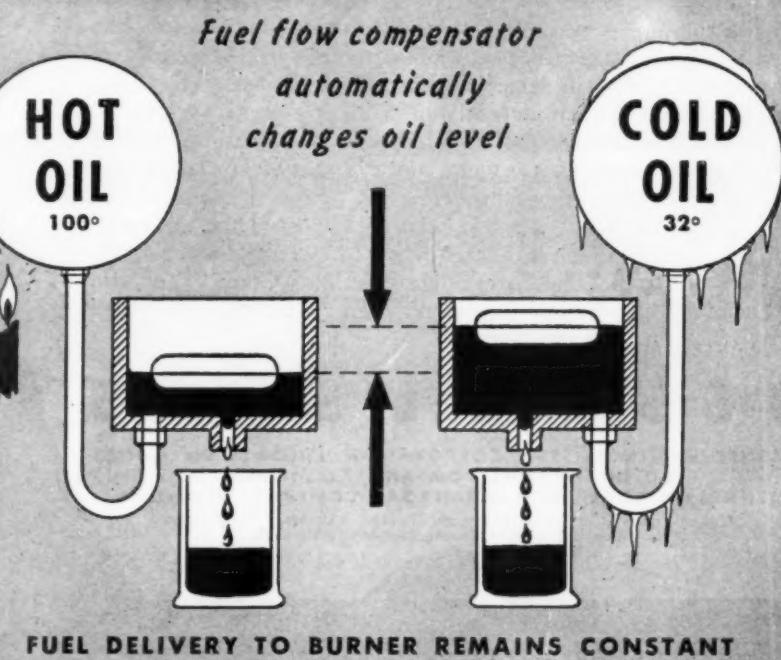
FURNACE COMPANY • DOWAGIAC, MICH.

Steady, even fuel flow regardless of oil temperature with "DL" FLOAT VALVES

*The automatic fuel
flow compensator
does it!*

The viscosity of fuel oil varies with the temperature. Cold fuel oil flows slowly—warm oil, freely. Without the automatic compensator, the fire in the burner would die down if the fuel were cold. If the fuel were warm, too much would be fed to the burner, with resultant waste and overheating.

The automatic compensator "feels" the temperature of the fuel oil and raises or lowers the position of the float—increasing or decreasing the head pressure on the metering valve to maintain constant fuel flow.



THE automatic fuel flow compensator consists of a piece of thermostatic bi-metal which supports the float. When the fuel oil is cold the bi-metal warps and raises the float—allowing the oil level in the float valve body to rise. When the fuel is warm, the bi-metal compensator warps in the opposite direction, lowering the float and consequently the liquid level. Since the fuel delivery through the metering orifice depends upon the head pressure above the needle and the viscosity of the oil, this action of raising or lowering the float results in a uniform rate of fuel delivery regardless of fuel temperature.

This method of compensation, using the temperature of the fuel, is an important feature.

It is but one of the many reasons why you should insist upon "DL" equipped heaters when you are selecting a line to sell.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

Division of **AMERICAN RADIATOR & Standard Sanitary CORPORATION**



"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Venti Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubricators.

There's work for you... NOW!

YOU know that home and plant owners right in your town are anxious to repair and remodel their long neglected dwellings and factories.

Now is the time to plan how you will get your share of that local business. For it will surely include a strong demand for sheet metal roofing, gutters, downspouts, air-conditioning ductwork, chimneys and ventilators.

When the time comes, you will be able to get—for every job—the right type of U·S·S Steel Sheet. Common black steel—copper steel to resist corrosion—galvanized steel fit to face any weather—Paint-Bond, which holds paint instantly and with an enduring grip.

You will find the famous U·S·S Label on the most complete line of steel sheets put out by any one concern. It is your guarantee of top quality—superior workability.

To help you get all the advantages made possible by advanced shop practice and to select the right U·S·S Steel Sheet for each job, we have prepared "The Sheet Metal Worker's Guide." You will find it a helpful, practical handbook. We'll gladly send you a free copy. Just drop us a line today.

U·S·S STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago
 COLUMBIA STEEL COMPANY, San Francisco
 TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
 United States Steel Supply Company, Chicago, Warehouse Distributors
 United States Steel Export Company, New York



U·S·S STEELS FOR SUCCESSFUL SHEET METAL WORKMANSHIP

U·S·S GALVANIZED STEEL for sheet metal structures requiring the added protection of a zinc coating.

U·S·S COPPER STEEL to give twice the atmospheric corrosion resistance of regular steel at little additional cost.

U·S·S PAINTBOND—A galvanized, Bonderized sheet that permits immediate painting and holds paint tighter. U·S·S Dul-Kote, a product with properties of equal value, available in the South and West.

U·S·S HOT-ROLLED AND COLD-ROLLED STEEL to provide the basic advantages of steel, plus maximum economy, in accordance with the needs of each individual job.

U·S·S STAINLESS AND HEAT-RESISTING STEELS to assure high resistance to corrosion and heat, and to reduce weight.

U·S·S VITREAMEL—Sheets designed especially for porcelain enameling.

U·S·S LOW-ALLOY, HIGH-STRENGTH STEELS to resist corrosion and increase strength-weight ratio.

UNITED STATES STEEL

LET'S LOOK AT THE POSTWAR FURNACE MARKET



*Furnaces needed
for new homes - 1,400,000*
*Furnaces needed
for replacement 3,000,000*
*Total Furnaces needed for
1st 5 Postwar Years 4,400,000*

FIGURED conservatively that's the size of the immense market for warm air heating equipment for the first five years after the war—4,400,000 furnaces or an average of 880,000 furnaces per year. Here's the way these amazing figures were determined: Out of 900,000 dwelling units per year, which is the average expert estimate on postwar residential construction 400,000 will be single-family centrally heated homes. Using the same proportion as in the five pre-war years 70 percent of these, or 280,000 new homes, will be equipped with warm air heating.

Now for replacement figures: Assuming the average life of a furnace to be 20 years, then the furnaces sold 20 years ago should be replaced now. In the five years, 1920 to 1924, 1,710,000 furnaces were sold. In 1940 to 1944, 1,615,000 furnaces were sold. Of the latter we can assume conservatively that 615,000 were for new homes, and 1,000,000 for replacement. This leaves a replacement back

log of 710,000 furnaces which has been built up during the war years.

Next we consider 2,285,000 furnaces sold in the five year period 1925 to 1929, twenty years ago, which should be replaced in 1945 to 1949. Adding this figure to the 710,000 deficiency we have in round numbers 3,000,000 furnaces to replace in the next five years, or an average of 600,000 furnaces per year. Adding this to the figure of 280,000 for new homes we have a market of 880,000 furnaces per year or a total of 4,400,000 furnaces for the first five postwar years.

To help you get your full share of this large potential warm air heating market RYBOLT engineers are planning and working ahead on new developments that will greatly advance heating efficiency and economy. As we said before, the RYBOLT postwar line will be the best that sound engineering and modern manufacturing methods can produce. It will give you all you need to build and hold postwar heating business.

**BUY MORE
WAR BONDS!**



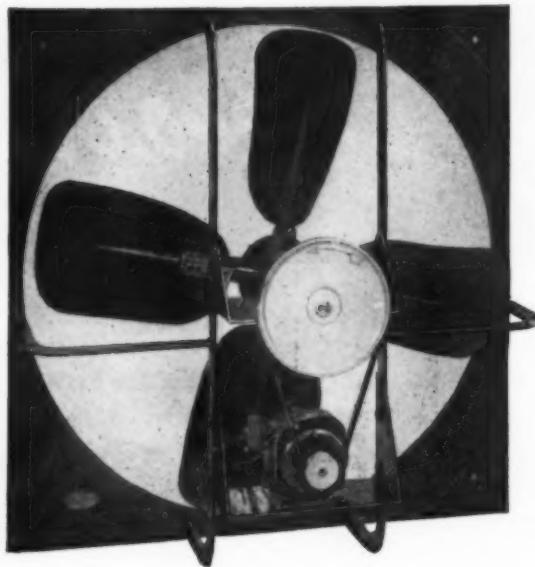
THE RYBOLT HEATER COMPANY
615 MILLER STREET

ASHLAND, OHIO



Health-aire Belt Driven Propeller Fans . . .

Available in all sizes 24 to 54 inches and capacities 4,500 to 25,000 C. F. M.



Here are Health-aire Features

- All steel welded construction
- Capacitor, long hour, resilient mounted motors
- Bronze, self-aligning bearings
- Dynamically and statically balanced for quiet operation
- Adjustable tension, over-powered drives
- Rated and tested in accordance with ASHVE and NAFM codes for propeller fans.

FOR "climate as you like it" . . . for a full measure of comfort and ventilation in all residential, commercial, industrial and public buildings, the Johnson **Health-aire** belt driven fan is your best bet!

Backed by 25 years' experience in designing and manufacturing propeller fans and blowers, Johnson **Health-aire** belt driven fans combine the most advanced, the most effective engineering ideas.

For manufacturing plants, laboratories, offices, restaurants, hotels, grocery stores, auditoriums, churches, funeral homes and all other similar places, Johnson **Health-aire** fans are guaranteed to give the finest performance.

These fans are available in sizes 24 to 54 inches and in capacities of 4,500 to 25,000 C.F.M. Order Johnson **Health-aire** belt driven propeller fans for all your needs!

Are You Set for Next Spring Deliveries?

Johnson Fan & Blower Corporation invites your correspondence concerning delivery and distribution set up for next spring. Anticipate your requirements now. Write Johnson today for full details concerning our plan that will supply you with your needs for next spring and summer.

JOHNSON FAN & BLOWER CORPORATION
1319 WEST LAKE STREET

CHICAGO 7, ILLINOIS



"Janitrol
KEPT
ME WARM
OVER
EUROPE"

HERE'S a flier on furlough, planning for the time when his dreams for a home of his own will become a reality. How natural in his selection of heating equipment, to look to the same manufacturer who today is providing our Armed Forces with the world's finest aircraft heaters.

But there's more than a friendly feeling behind this flier's preference for Janitrol. He knows that the same engineering skill and combustion research behind the Janitrol Aircraft Heater are also applied to Janitrol home heating units. Just as the aircraft heater was designed *specifically* to burn

gasoline as a fuel, all Janitrol industrial and domestic heating units are built *specifically* for the efficient combustion of gas. So it's a sure bet that Janitrol Gas-Fired Winter Air Conditioner the flier is planning on will be his best buy in performance and long lasting economy of operation.

Well, he's right. There's no other type of gas heating equipment which combines all the outstanding features Surface Combustion has engineered into Janitrol. Amplifire burners which concentrate the flame into a smaller, hotter space. Multi-thermex tubes which quickly transfer heat to the air stream. New automatic controls

to maintain accurate temperatures for greatest possible economy. Complete factory assembly on popular size models to save installation time and costs. And extreme compactness to save space in the modern home. These are only a few of the many Janitrol advantages which will give America's home owners new heating comfort and long-lasting liveability just as soon as critical materials are again available.

To help your clients with their postwar homebuilding plans, write Surface Combustion, Toledo 1, Ohio, for further descriptions and information.

Janitrol

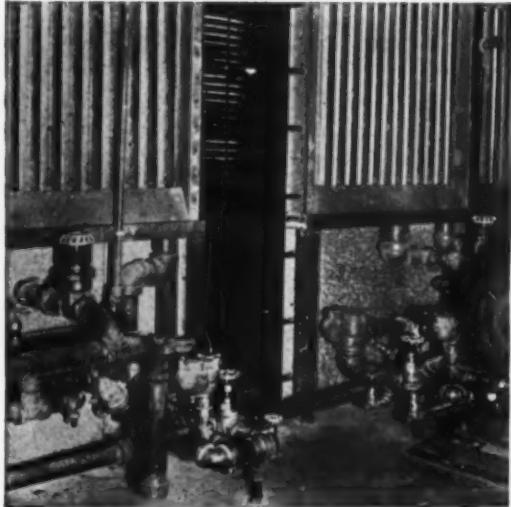
**GAS-FIRED
HEATING EQUIPMENT**





AEROFIN

Heat Exchange Surface



Aerofin Nonfreeze Coils in one of the main fan rooms of the Manufacturing Building of a large midwestern bomber plant.

NON-FREEZE FOR UNIFORM TEMPERATURES

Your Protection—Against loss of production time and materials, due to freeze-ups, under any and all weather conditions.

Uniform Temperature Control—By steam throttling through entire range.

Non-Stratifying—Under all load conditions regardless of steam pressure.

Aerofin "Non-freeze" Coils have proven by experience to be efficient and to give uninterrupted performance.

Consult Aerofin's nearest office for complete details.

AEROFIN CORPORATION

410 S. GEDDES ST., SYRACUSE 1, N. Y.

Chicago Detroit New York Philadelphia Dallas Cleveland Toronto



I said, "Boys, I'll be back...in a hurry!"

*Returning to the factory for a week's visit after
a 22-month Army assignment, T. D. McCarthy,
T.S.A. District Sales Manager, on leave, said:*

"I thought I knew all about Timken Silent Automatic.

"Before the war, I had one of the best sales territories in the country. We led the field more than our share. Won lots of prizes—trips, too. Sold a lot of burners. Made a lot of friends.

"Guess we were pretty cocky at times! Who wouldn't be when they are selling more merchandise at a higher price than 2 or 3 competitors combined were selling at much lower prices? But I learned more in the last week than I learned in any single year.

"Of course, I had seen several Timken national magazine ads. I noticed copy in newspapers and trade papers, too. But I never knew people were so interested in new homes and heating equipment till I saw the records of more than 200,000 coupon responses.

"Then, when I saw literature the factory mailed out to help dealers get business during the emergency . . . the way the factory helped users . . . the advice given . . . the service tips . . . the fuel conservation aids sent out . . . I knew I had a lot to learn—the



Cape Cod Home, designed by Royal Barry Wills. One of a number of new homes by leading architects featured in Timken Silent Automatic advertising.

I visited the research lab! Saw the work done on new models, new developments, new designs . . . the testing, checking, and rechecking to insure Timken quality and performance . . .

"I got a peek at postwar plans . . . for selling burners, for securing better salesmen, for insuring dealer profits . . . and my enthusiasm hit a new high. I just couldn't get the words out quickly enough—'Boys, I'll be back . . . in a hurry!' I want to tell every dealer I contact the full story behind the Timken Franchise. I never fully understood it before.

Would you like to hear the full story behind the Timken Franchise? Write us NOW!



This Timken Silent Automatic Oilfurnace with a Wall-Flame Burner will insure lasting satisfaction and comfort in this Cape Cod Home. Other Timken Oil-Burning Products for homes of all sizes and types will be ready after Victory.

TIMKEN

Silent Automatic

Quality Home Appliances for Comfort, Convenience and Economy • 20 Years of Faithful Service to American Home

Division of THE TIMKEN-DETROIT AXLE CO., Detroit 32, Michigan

*Folks sure seem to want
what's in this book!*



Warm Air Heating and Winter Air Conditioning were taken for granted until the void caused by their absence was felt. It will be a great day when they come back and the demand will be very heavy.

SUNBEAM Warm Air Products will be back when the urgent need for war production ceases; then their manufacture will be resumed on a larger scale than ever. In the meantime you are urged to take good care of your SUNBEAM catalogue, so that it will

be ready to serve you when needed. Paper is scarce, new binder covers are not now obtainable and our supply is exhausted. New catalogues will be produced when conditions permit,—but there may be inevitable delays due to causes beyond our control.

So take good care of your catalogue pending the day the SUNBEAM Warm Air Equipment shown between its covers is again available.



**AMERICAN & Standard
RADIATOR & Sanitary**
New York CORPORATION Pittsburgh

CHECK
THE FACTS...

AND YOU'LL
FIND

OIL-O-MATIC WELCOMES ARMY FUEL OIL PRESENT OR FUTURE

POSTWAR predictions indicate new types of richer, heavier, but *barder to handle* fuel oil. High pressure oil burners, whose pin point orifices have always been subject to *periodic nozzle clogging*, may find such fuel oil even more difficult to "digest" than that of today.

Oil-O-Matic does not fear but *welcomes* these new types of fuel oil. The patented Williams Oil-O-Matic LO-PRESSURE Oil Burner, with its large fuel feed opening, is built to handle them . . . in fact, has been ready for them for more than 25 years!

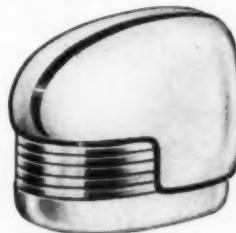
WILLIE O-MATIC says: "Anyone who handles Oil-O-Matic low pressure burners knows that no service problems are created by low grade fuel oil. Just ask one of the hundreds of Oil-O-Matic dealers."



WILLIAMS
OIL-O-MATIC
HEATING



For excellence in production of the toughest kind of precision-built war materials, Williams employees have *four times* won the Army-Navy Award! Such a record is indicative of the still finer products that will come with peace.



WILLIAMS OIL-O-MATIC HEATING CORPORATION • BLOOMINGTON, ILLINOIS

Built tough
TO DO
**TOUGH
WORK**



**GENUINE CRESCENT
SPARE
PARTS**
Available

PIN POST	PIN
PIN	TENSION SCREW
WASHER	WING NUT

CRESCENT HACKSAW FRAMES

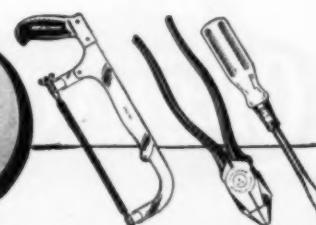
have long been designed and built to do tough work . . . they are made of heavy steel for the extra rigidity needed on many jobs and are electrically welded at the points of greatest strain. Like other Crescent Tools, they are now going mostly to our soldier and sailor mechanics. Someday, and it can't be too soon to please us, they will again be displayed and sold by hardware dealers. Help keep the ones now in use by repairing with Genuine Crescent Spare Parts.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.



CRESCENT TOOLS

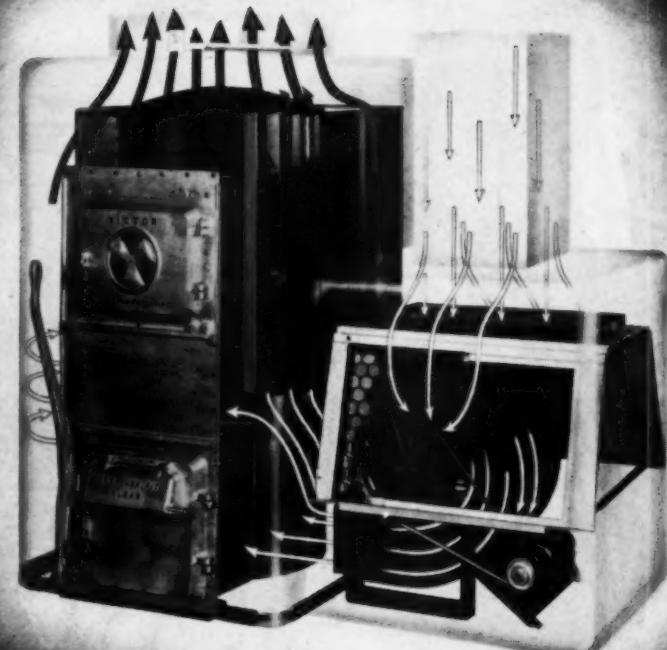
Give Wings to Work



"To get that Furnace with
FINS I'd wait two months
for a VICTOR!"



- and they **WILL** wait
after seeing the table top
Demonstrator in operation.



VICTOR

THE FURNACE
WITH THE
HEAT RADIATING **FINS**

An Experienced
Engineering
Department that
Helps You Sell

When you ask Hall-Neal's Engineering Department for a heating layout, information or assistance, it comes to you from *practical* heating engineers, headed by Guy A. Voorhees. They have all had experience as heating contractors . . . they know your problems and they give you a workable solution.

We all know that deliveries on most things today are delayed by scarcity of materials, labor and shipping facilities. But—Hall-Neal dealers have something more than just a good furnace to sell. VICTOR furnaces are equipped with the famous, patented, heat radiating FINS and it is being proved every day that buyers in homes and in factories **WILL** wait to get a "VICTOR."

Since 1890 — VICTOR furnaces have maintained a standard of quality unsurpassed by any furnace manufacturer. We are proud of that rating and are maintaining that standard despite present day difficulties. We have not "cut short the shirt tails" to meet competition and increase production. The VICTOR you sell today is the same fine furnace it always was.



Just as FINS on air cooled airplane engine cylinders offer more metal surface for air to "rub heat off of," so Hall-Neal furnaces "FINS" furnish many more square feet of hot metal for the air in the furnace to rub heat from.

—**IF YOU'D LIKE TO BE A "VICTOR" DEALER** —

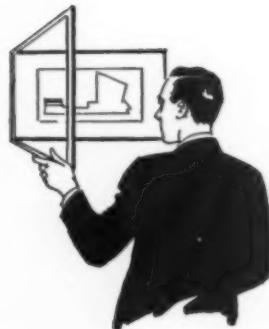
Write us about yourself. Give us full particulars. Selling the "Victor" line will make you more money because you'll make more sales!

Write!

HALL-NEAL FURNACE Co.

VICTOR Quality Furnaces Since 1890

1326 N. CAPITOL AVENUE • INDIANAPOLIS 7, INDIANA



There's a change in the stoker picture

• If you are thinking of selling stokers in the postwar period, you might as well recognize the fact that the stoker picture is changing—the public is demanding *completely* automatic coal heat—no longer satisfied to fill stoker hoppers or dig clinkers—the public wants a stoker that feeds coal from bin to furnace and *automatically removes its own ash*.*

*If you are interested in the first successful Bituminous Bin-feed Ash Removal Stoker already used by thousands and manufactured for over ten years, we will gladly send you full information.

WRITE
TODAY!
"ORIGINAL"
POCAHONTAS
BIN-FEED ASH REMOVAL STOKERS

MANUFACTURING

To produce progressively better and better goods is the aim of all forward-looking manufacturers.

Luxaire's purpose from the very beginning has been and always will be the manufacture of better heating and air conditioning equipment. This is a definite, well-established Luxaire plan.

In the production of war equipment, this plan has enabled Luxaire to deliver such equipment in greater quantities in less time and at a saving in critical materials as well as valuable manpower.

When peace returns, this same plan of progressive manufacturing will make possible a greater production of Luxaire products in less time and at lower cost—benefits which will be directly reflected in the profits of those who sell and install Luxaire heating and air conditioning units.

Luxaire

THE C. A. OLSEN MANUFACTURING CO., ELYRIA, OHIO

THE PRE-WAR LINE OF LUXAIRE WARM AIR HEATING
AND AIR CONDITIONING UNITS FOR COAL, GAS, OIL



Series 600
Coal Fired Steel
Gravity Furnace



Series C
Coal Fired Cast
Gravity Furnace



Series 700
Coal Fired Steel
Gravity Furnace



Series AC-700
Coal Fired Steel
Air Conditioning
Unit



Series A
Gas Fired Steel
Air Conditioning
Unit



Series G
Gas Fired Steel
Gravity Unit



Series II
Gas Fired Steel
Utility Air Con-
ditioning Unit



Series 8000
Oil Fired Steel
Air Conditioning
Unit

Since 1866



SYMBOL of Distributor - Dealer LEADERSHIP



Customer satisfaction builds leadership. WEIR-MEYER equipment for Modern Heat builds customer satisfaction. Here are a few reasons why:

OUTSTANDING QUALITY—FINER PERFORMANCE

LOWEST OPERATING AND UPKEEP COSTS

LONG LIFE (many WEIR furnaces have been in continuous operation for over 50 years!)

MODERN STYLING—SOUND ENGINEERING

Find out about WEIR-MEYER. You may be in "open" territory.

THE MEYER FURNACE CO.
WEIR and MEYER FURNACES-AIR CONDITIONERS
FOR COAL - GAS - OIL

PEORIA 2

ILLINOIS



WEIR U Series STEEL FURNACE
Entirely new construction principle
(Patent applied for) Famous WEIR
time-tested features.



MEYER Gas-fired AIR
CONDITIONER
Built for efficiency and durability.
Easy to install. Finer performance.
Greater convenience.



MEYER Oil-fired AIR
CONDITIONER
Gives the user of oil a new conception
of cleanliness, efficiency, economy of operation.

WEIR-MEYER MEANS Modern Heat

tested up to
1000° F.

Weirzin

ELECTROLYTIC ZINC-COATED SHEETS AND STRIPS

prove their resistance to

HEAT

MOISTURE

FLAME

Where high heat and humidity must be encountered Weirzin is the proved winner . . . Because of its exceptionally tight coherence of coating, Weirzin gives designers two outstanding advantages: (1) A product that will not peel, flake or powder under high temperatures (2) An exceptionally ductile material that will take deep draws and severe vibration without ordinarily requiring subsequent heat treatment.

Try this test. 1000° F. for 60 minutes; cool specimen and repeat operation 4 times. Then subject samples to a saturated humidity at 100° F. and repeat after cooling . . . These unretouched photos magnified twice size show you what happens to Weirzin after such treatment—nothing but a slight and spott discoloration—no flaking—no peeling—consequent no rust . . . All other materials tested failed.

COATED
.20 oz. Per Sq. Ft.

Weirzin—the answer to many service and production problems. It is available in coils or cut lengths, from $\frac{3}{8}$ to 5" widths. Write for the Weirzin booklet and get the complete story of a product that offers you a substantial business advantage.



WEIRTON



STEEL CO.

WEIRTON, W. VA. Sales Offices in Principal Cities
WEIRTON STEEL CORPORATION Executive Offices, Pittsburgh, Pa.



CREATIVE ELECTRICAL ENGINEERING



Industry is entering an era of electronics, marked by the keenest competition in business history. The rich rewards will surely go to those who employ Creative Electrical Engineering to best advantage.

In this highly technical field, LELAND Electric has solved many difficult electrical problems with skill and ingenuity. This valuable experience may be the key to your post-war plan. We invite your inquiry.

THE Leland ELECTRIC COMPANY
Dayton 1, Ohio. In Canada: Leland Electric Canada Ltd., Guelph, Ontario

MOTOR GENERATOR SET, NAVY TYPE 3 UNIT—A.C.
or D.C. drive, and up to 2½ KW, A.C. or D.C. output
—special frequencies, governor speed controlled.

Conserve Vital Man Hours WITH **MONCRIEF FITTINGS!**

DIE STAMPED · MACHINE MADE!

CUTS INSTALLATION COSTS!

BEST BY INSTALLATION TEST!

**MONCRIEF · WARM AIR
PIPE AND FITTINGS**

Write for Catalog GF-44



WARM AIR
FURNACES
FURNACE PIPE
AND FITTINGS

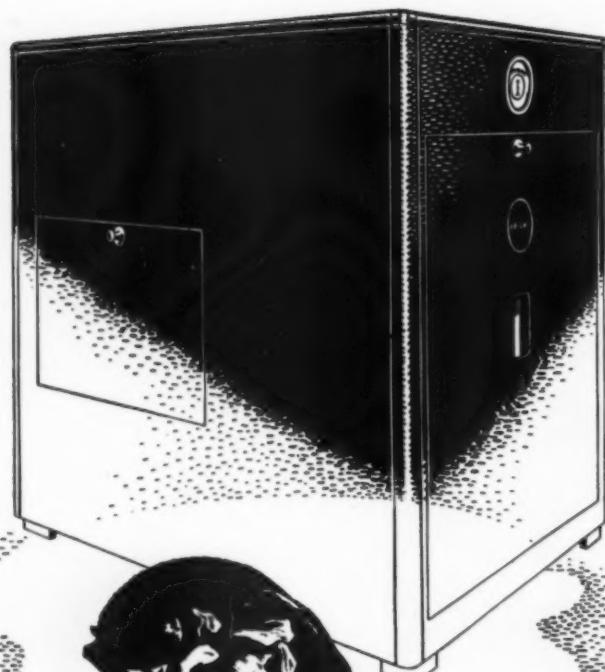


AIR CONDITIONING
SYSTEMS FOR
COAL . . .
GAS . . . OIL

THE HENRY FURNACE CO.

MEDINA, OHIO

AN AUTOMATIC END TO FIRE WORSHIP



Think how long people have been tied to a fire pit. Centuries!

Only within recent years has a homeowner been able to touch a gadget on the wall, go away—for a month if he wants to—and know that come storm or blizzard, an automatic gas heating unit will hold the temperature in his home exactly where he wants it.

Bryant pioneered the compact, fully automatic gas boiler . . . since has followed with perfection of winter air conditioners, gravity furnaces and conversion burners. Bryant steadily brought the price down, with the conviction that even the smallest of homes is entitled to the convenience, comfort and cleanliness of modern, automatic heating . . . gas heating with fluid fuel, always on tap, never needing to be stored, shoveled or cleaned out afterwards.

"Let The Pup Be Furnace Man"—a suggestion to every homeowner in favor of more leisure from Bryant, one of the Dresser Industries.



DRESSER Mfg. Division, Bradford, Pa.

THE BRYANT Heater Company, Cleveland, Ohio

CLARK Bros. Co., Inc., Olean, N. Y.

PACIFIC Pumps, Inc., Huntington Park, Calif.

INTERNATIONAL DERRICK & Equipment Co.,
Columbus and Marietta, Ohio; Beaumont, Texas;
Torrance, Calif.

THE PLUS OF DRESSER

Back of every Bryant product stands DRESSER INDUSTRIES—a central source of strength backing the independent managements within the Dresser Group. Dresser Industries furnishes them a Plus—a double backing that is a solid foundation for progress; a double O.K. upon their products that is extra assurance of satisfaction to their customers.

ROOTS-CONNERSVILLE Blower Corp.,
Connersville, Ind.

STACEY BROS. Gas Construction Co.,
Cincinnati, Ohio

BOVAIRD & SEYFANG Mfg. Company,
Bradford, Pa.

DRESSER Mfg. Co., Ltd.,
Toronto, Ont., Canada

VAN DER HORST Corp. of America,
Olean, N. Y. and Cleveland, Ohio



THEY'RE
counting on
BETHLEHEM
SHEETS

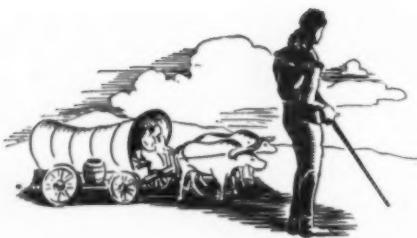


Men who know their steel sheets—men who work at forming and drawing operations day after day—know that Bethlehem Cold-Rolled Sheets do a consistently good job because they're uniform, ductile and easy on dies.

Under pressure of wartime needs, Bethlehem Sheets have come through—and brilliantly—drawing operations more drastic than were dreamed of a few years ago. When the fighting is finished, users of Bethlehem Sheets will be putting this wartime experience to good account.

Makers of refrigerators, automobiles, metal furniture, gasoline pumps, heating and ventilating apparatus, and other equipment in vast variety, together with sheet-metal contractors—they're counting on Bethlehem Sheets to do a postwar job for them.

They know their finished product will not only have high performance-appeal, but will also show real eye-appeal, thanks to the fine surface finish and all-around high quality of Bethlehem Sheets.



KRESKY PIONEERED . . .

...oil-fired floor furnaces

Kresky led in perfecting oil burning floor furnaces by producing the first burner to employ mechanical induction of air. This basic advancement made possible economical heat for the home, completely free from smoke and soot.

Kresky was also the first to submit for Underwriters Laboratory approval: (1) an oil fired floor furnace; (2) an oil fired furnace with dual register.

Kresky has likewise been a leader in perfecting automatic control for floor furnaces and in making them highly efficient with a clearance of as little as 30 inches below the floor.



OPENINGS FOR DISTRIBUTORS

Besides Oil Burners and Floor Furnaces, the Kresky line includes Space Heaters, Basement Furnaces, Hot Water Heaters, Commercial and Domestic Range Burners, and Conversion Burners suitable for a wide range of oil burning appliances.

They make a line on which any aggressive distributor can build a large and stable volume of business. Write us for full particulars.

KRESKY MFG. CO.

Pioneers in Oil Burning Equipment
Since 1910

PETALUMA

CALIFORNIA



"Pet" Floor Furnace
Dual Register Model
30" Clearance

CHRYSLER AIRTEMP



Designs for Better Living

Young enough to keep a fresh, new outlook—old enough to have a background and engineering experience—Chrysler Airtemp is keeping pace with tomorrow. More eye-appeal, compactness and flexibility will feature the Chrysler Airtemp heating, "Packaged" cooling and commercial and industrial refrigeration equipment lines after Victory.

The Chrysler Airtemp Triple Line . . .

Heating, Cooling and Commercial Refrigeration . . . offers heating dealers an opportunity for *12 months profitable operation*. Direct dealer contracts will be available for just the Chrysler Airtemp heating line—or for heating in combination with air conditioning or commercial refrigeration—or for all three lines. • Airtemp Division of Chrysler Corporation, Dayton 1, Ohio.

Buy More War Bonds! Tune in Major Bowes every Thursday, CBS, 9 p. m., E. W. T.

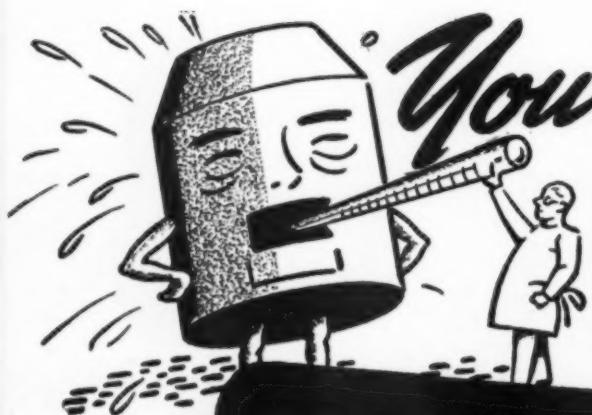


THE 4 FUNDAMENTALS of CHRYSLER AIRTEMP DEALER OPERATIONS

1. Engineered Installation
2. Proper Display
3. Outside Selling
4. Customer Service



HEATING • COOLING • REFRIGERATION



You're the Doctor...

When it comes to
FUEL SAVINGS
and Temperature Control

"Prescribe" THE  **3-PIECE AUTOMATIC
HEAT REGULATOR SET**

Includes Thermostat, Limit Control, Damper Regulator Motor, all necessary accessories — NO EXTRAS to buy! More than ten years of successful use in thousands of homes and as standard equipment by leading furnace manufacturers. Carries the same Dependability reputation as all A-P precision-built controls.

Note
THESE OUTSTANDING CONSTRUCTION AND
OPERATING FEATURES OF THE A-P AUTO-
MATIC HEAT REGULATOR SET:

 **MODERN WALL THERMOSTAT**

Modernistically designed, the A-P Thermostat controls room temperature within 1° variation above or below setting. All operating parts in special composition base, easily mounted on wall without disfiguring — needs only $\frac{1}{4}$ " hole for cable. Accurately calibrated thermometer in cover. Needs only convenient manual setting for steady heat control.



 **LIMIT CONTROL**

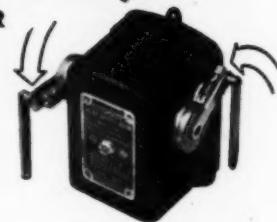


Important in preventing overheating and consequent fuel waste, this limit control stops built-up furnace heat from causing room temperature to coast way above thermostat setting. Convenient dial can be set according to season and outdoor temperature.



DAMPER REGULATOR

Compact and sturdy, A-P Damper Regulator Motor has exceptional lifting power. Gears and pinions of high grade steel — all electrical connection carefully soldered — corrosion-resistant for base. Built for long service. Motor requires no attention except to oil once a year.



Exclusive Relatching Feature. Special spring latch knob is provided on each of the two arms of the A-P Damper Regulator, permitting dropping of arms for closing the draft and check when stoking fire. Arms automatically relatch at the next motor operation. An important safety feature.

ACCESSORIES — included in complete set: Transformer, conductor cable, plated non-rusting furnace chain, cable wires, rust-resistant pulleys, insulated staples, screws and snap links, and complete instructions.

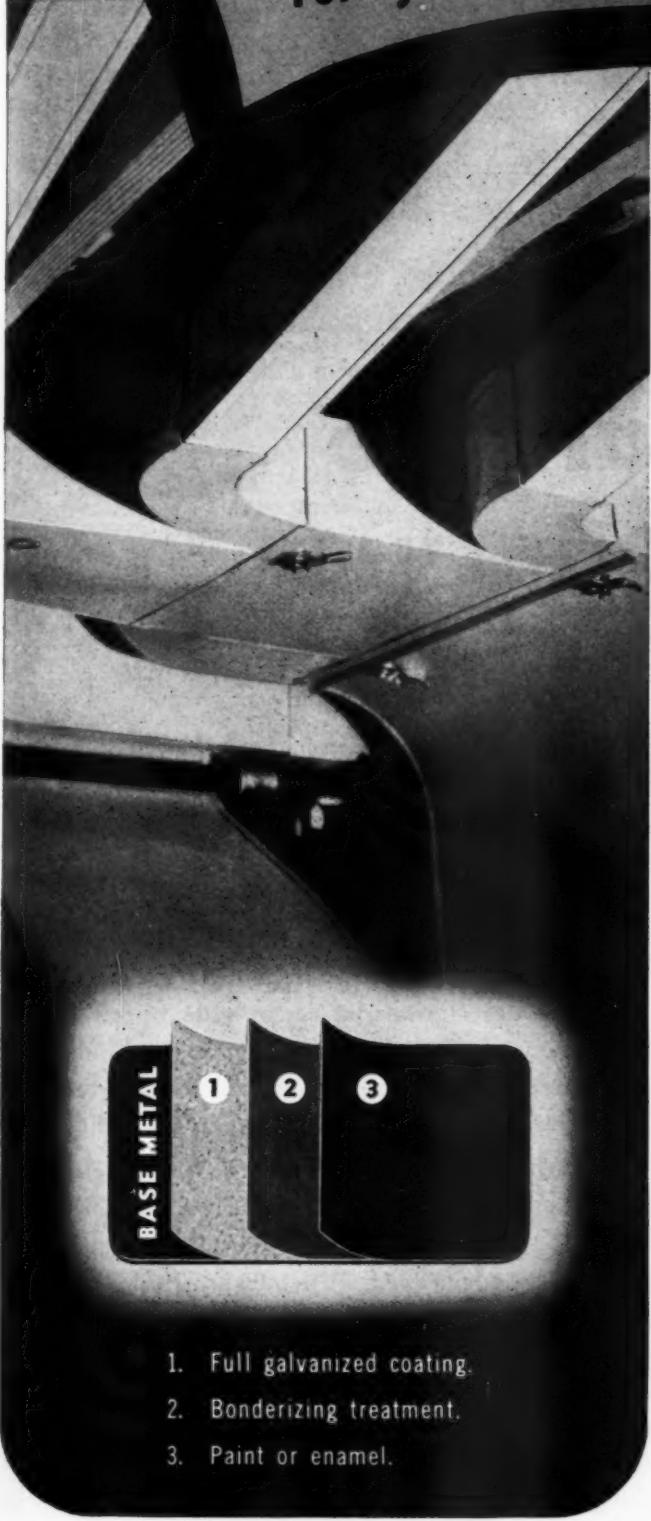
Recommend the complete 3-Piece A-P Automatic Regulator Set for steady comfort, convenience, years of fuel saving furnace and boiler operation. Competitively priced.

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FOR HEATING • AIR CONDITIONING • REFRIGERATION



here's *Triple Protection* for your Painted Sheet Metal Work

Many sheet metal men have learned that ordinary sheet metal is not good enough for their customers — that they must have "triple protection" for vital sheet metal equipment and construction.

You can offer this too. Three-way protection is assured when you use ARMCO Galvanized PAINTGRIP sheets for air ducts, roof drainage, and other painted construction. Galvanized PAINTGRIP has a full zinc coating under a mill-applied Bonderized surface. Bonderizing prepares the surface for the third protective coating — the paint that's applied after your work is done.

It's a well-known fact that paint lasts several times longer on PAINTGRIP than on ordinary galvanized sheets. There is no unsightly peeling or flaking.

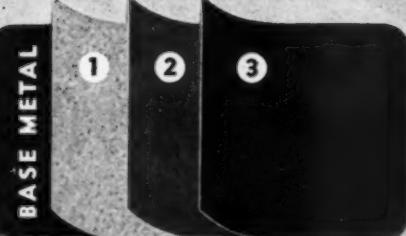
Cuts Costs Too

You can promise more than long service when the time comes to use ARMCO PAINTGRIP. It works and solders as well as any good galvanized sheet and can be painted immediately without pre-treatments. Paint goes on quickly, smoothly—without the acid etching that destroys part of the protective zinc coating.

Consider ARMCO PAINTGRIP Sheets for all work to be painted — for durable protection and lasting beauty. There is a choice of three base metals: ARMCO Ingot Iron, copper-bearing steel or plain steel. Ask the nearest Armco distributor for information. The American Rolling Mill Company, 381 Curtis St., Middletown, Ohio.

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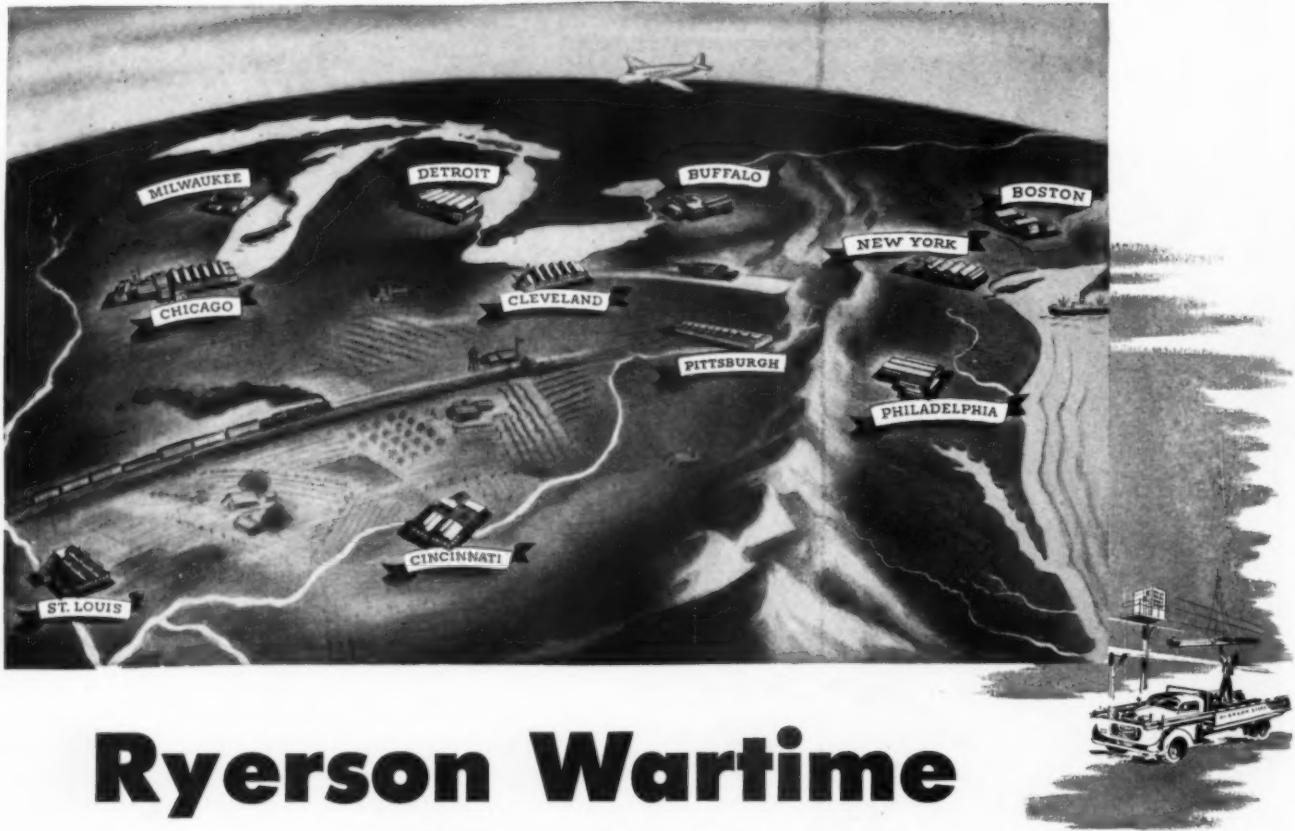
Write for free copy of useful booklet, which gives complete information about the original galvanized Bonderized sheet metal that takes paint and preserves it.



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RESIDENTIAL AIR CONDITIONING • WARM AIR HEATING • SHEET METAL CONTRACTING

No Remedy Yet For Our Manpower Problem

THE worst headache, throughout 1944, for the warm air heating-sheet metal industry was manpower. Almost no dealer or contractor had enough men. We did think that the lessening in war plant construction might release many hundreds of skilled sheet metal workers, but so far as we can determine, these men did not get back into the industry or their number was too small to make a noticeable impression.

A great deal of energy was spent in 1944 on plans and schemes to alleviate the manpower shortage—seemingly the shifting of men from less essential to most essential work plus new recruits from retired persons, youngsters, women did help the war plants, but did not help our industry. The possible exception might be metal fabricators whose need is for unskilled workers who can quickly be trained to become machine operators.

As we enter 1945 the manpower picture looks very black. We might expect that out of the welter of schemes and orders there should emerge additional manpower—but it will go to war plants and not to civilian service firms. What has happened and is likely to happen can be summarized briefly.

War Manpower Commission, at this writing, seems likely to struggle along without any benefit of a national service law and must depend, as in the past, on persuasion, cooperation, and the draft to channel workers into the most critical occupations. Since WMC has never recognized our industry as anything but *essential* and since there is such a tremendous demand for workers from *critical* industries there seems small likelihood our industry will benefit from WMC.

Eventually, it is reported from Washington, many of the agencies which now handle labor will find permanent offices under the Department of Labor. But no such shift holds much help for us because such agencies as U. S. Employment Service, Apprenticeship and Occupational Training Branch of WMC, and labor activities of WPB and WLB have been only of minor help to us in 1944 and by no thinking can be any greater help this year.

This is no criticism of these agencies or their functions—their reason for being is to help the war effort and their greatest contribution is, of course, to see that war plants have the men they need. There is, we

believe, still much hoarding of labor in many plants. Particularly plants making items on what amounts to a "cost plus" basis—the more labor the more profit. But war is a wasteful business and only if the civilian economy shows signs of falling apart can we expect preference over war plants.

So this industry starts 1945 in pretty much the same manpower condition as in 1944. The steps we took in 1944 to combat labor shortages must be used again in 1945. Quite likely the helps we eagerly sought in 1944 will once again prove just so much wishful thinking. We refer to such programs as veteran release into the industry of the veteran's choice. There must have been veterans who asked to work in our industry, but only a handful of shops of our acquaintance got veterans. Probably the reason is veterans prefer to work at some trade more directly connected with the war—tanks, planes, etc.

And we didn't find in 1944 much evidence of help from apprenticeship training programs or vocational training programs for adults—there is little reason to feel these will be more beneficial in 1945.

There are only a few things this industry can do in the face of manpower shortages. First, each shop can turn away work which can't be handled. We did that on an accelerating scale last year, we will have to do it again this year. Second, the owner can put on the overalls and go to work—thousands of owners did that last year, more will do so in 1945. It should be suggested in this connection that the owner use some judgment—it's not making the most of man-hours if the owner is a skilled service man but insists on hanging gutters or wrestling furnaces.

Third, many owners have taken their wives or daughters or relatives into the office to answer the phone, wait on customers, thereby letting the owner do some direct labor himself. Part-time or full time, a girl in the office adds many hours to the owner's day.

From here on suggestions can be only a report of schemes tried—too many to enumerate; impossible to operate except by the person using them and we get back to our first solution—take (because you can only do) as much work as you can handle and no more. If you haven't already, install some sort of a priority schedule—the man without heat needs you more than the fellow who just wants his plant inspected.

Business Tax Deductions

By Arthur Roberts

ACCURATE accounting is essential to accurate tax reporting. However, even where accounting is accurate, tax savings are not always effected because the taxpayer does not take all permissible deductions or he interprets certain regulations in a way that increases his tax.

In general, the tax laws are concerned with losses and gains *during the taxable year*, so if the taxpayer overlooks a deduction in one year he cannot take it on a later tax return. For this reason, taxpayers filing on an accrual basis should see that all expenses are accrued to the end of the taxable year whether these expenses are paid or not within that year. Such taxpayers may deduct for an expense even though they owe for it.

Interest and Credit Sales

For example, if a taxpayer paid mortgage interest, due every 6 months, on October 20, 1944, at the end of the year he has an accrued obligation of 2 months' mortgage interest due the mortgagor, but it will not be paid until the next due date in 1945. This accrued expense may be deducted on the return for 1944.

By the same token, if the taxpayer sells a job on credit on October 20, 1944, and it is not paid for by the end of the year, he must include that sale as income on the 1944 return. Credit sales are the same as income when filing on an accrual basis. The taxpayer reporting on a cash basis cannot deduct any item unless he has actually paid it out. Neither need he report income unless he gets the cash within the taxable year.

Depreciation

Depreciation rates should be fixed carefully because here, too, the taxpayer cannot take advantage in later years of prior failure to take ample depreciation. If you short-change yourself on depreciation, you pay more tax and you can't recover in later years when you find that the rate should be adjusted upward. The straight-line method of fixing the depreciation rate is easiest and in use by most taxpayers. The Collector does not specify the method to use in reporting, but seems to prefer the straight-line method, so it is wise to adopt it. In the long run, we find that it gets the same answer as other methods, providing the rate is set correctly in the first place. You figure the rate on original cost to you dividing by the years of useful life, not necessarily *mechanical* usefulness, but *profitable* usefulness.

Bad Debts

Warm air heating and sheet metal shop operators often lose out on a deduction for bad debts because they do not deduce in the year the debt is ascertained worthless. If it can be shown that you knew a debt was worthless in a year prior to the one in which

you list it for deduction, it may not be allowed. Taxpayers on an accrual basis may report bad debts by deducting the debts as they become worthless or by deducting a reasonable sum set up as a reserve for bad debts. The taxpayer doing business on a *cash basis* cannot use the *reserve* method. If a specific debt is partially worthless, that portion of the debt may be deducted within the taxable year. If the debt may become worthless in a subsequent year, the taxpayer may wait until that time to make the deduction.

Non-business debts must be wholly uncollectible to be deductible. No deduction is allowed for partial worthlessness. A non-business bad debt is considered a short-term capital loss the same as a loss on a worthless security. The amount of non-business bad debts deductible is limited in the same way as a loss from the sale of a capital asset. Non-business expenses are deductible providing these expenses are incurred in connection with income that will be taxable, whether that income is realized during the current taxable year or not.

A taxpayer using the *reserve* method for handling bad debts should credit the *reserve* if a bad debt is subsequently paid. He need not report this recovery as income, but his bad debt *reserve* in that year, the amount he ordinarily would deduct, will be reduced by this recovery, so it amounts to about the same thing. If the bad debt was a direct charge-off and he collects subsequently, the taxpayer must report the recovery as income in the year received providing its deduction at the time it was ascertained worthless yielded a tax benefit. In other words, if the taxpayer writes off a bad debt in a loss-year and this deduction did not influence the loss, he need not report subsequent recovery as income. Say a taxpayer had a loss of \$1,000 in a taxable year, \$200 of which was a bad debt deduction; he would have lost \$800 without this deduction and not paid a tax anyhow, so he got no benefit for the bad debt charge-off and he need not report its recovery as income later.

Inventory

Inventory, unless calculated correctly, may increase the tax payment. Take inventory at cost or market, whichever is lower. If the inventory is calculated too high, you pay more tax. There are numerous ways of figuring inventory, but cost or market, whichever is lower, will give the best results in this field. In the December, 1944, issue of *AMERICAN ARTISAN* you will find additional information on inventory.

Work-in-Progress

Some taxpayers in this field have a habit of entering sales as made. If this entry is made at the end of a year and the job is not completed, the entire costs of this job will not be entered on the books during

the taxable year, inflating profit and increasing tax. An adjustment should be made on the books to enter the cost of the job to the end of the taxable year if you have included its selling price in income. In the January, 1945, issue of *AMERICAN ARTISAN* you will find more information on work-in-progress.

Sometimes taxpayers wish to change their method of reporting, from cash to an accrual basis, or vice versa, from the direct-charge-off of bad debts to the reserve method, from one method of computing inventory or depreciation to another. This is not permitted without the consent of the Commissioner of Internal Revenue to whom the taxpayer must apply at least 30 days before the close of the taxable year for which the change is intended to be effective.

Fire, Theft, Flood

Losses arising from fire, theft or other casualty are deductible in the year they occurred providing they are not covered by insurance. If a loss is only partially covered, the excess loss is deductible, but this excess may disappear under the method by which the tax office permits the deduction. You must take depreciation and salvage value into consideration, and when this is done, the value of a property may be reduced to the point where there is no excess. It all depends upon the case, but the taxpayer should not forget this angle in the event he must write off an un-insured loss. If he has been taking depreciation on the property, he has already been given credit for certain loss in value by the tax office, so he cannot claim it again.

You may not deduct auto expense on a pleasure car, but you may deduct a loss for auto damage for an accident not due to your willful negligence. You may not deduct rent for your private dwelling, but you may deduct a loss for a bursting boiler used in your residence or business or for damage by flood, bursting of water pipes through freezing, repairs to your home due to damage by storm or losses resulting to furniture, home, automobile from fire.

Advertising

Advertising is deductible as an expense if the outlay is reasonable and its ratio to sales is not out of line with experience figures or general trade practice. The test is whether the sum spent for advertising is an attempt to avoid proper tax. In the high tax brackets, a concern may get its advertising for as little as 20 cents on the dollar because if they did not advertise they would have to give the remainder to the government as tax and this is what the Treasury Department won't permit. However, the Treasury recognizes that even if a concern is working on war production, which it can get without advertising, that it must maintain goodwill for its peacetime products, therefore it permits a reasonable deduction for advertising. Many concerns during the last war quit advertising and found to their dismay that the public had forgotten them when peace came. This lesson hasn't been forgotten.

Some taxpayers are advertising to speed the war effort, to cut down accidents and absenteeism, to promote sales of war bonds, salvage and other wartime objectives. Such expense, if reasonable, is deductible. Incidentally, the high tax rates have cut the cost of advertising for all. The warm air dealer and sheet metal contractor who has discontinued advertising during the war because he can get all the business he wants without advertising should remember that it always pays to advertise; that if he does not take

a reasonable deduction for this expense, he pays that much more tax, that the net cost of advertising to him is the price he pays for white space less the additional tax he would pay if he didn't advertise.

Wage Withholdings

The individual income tax act of 1944 prescribes new rates of withholding taxes, but it is not necessary to change the payroll system to record accurately as long as you use an adequate system now. Those who have no systematic method of recording withholdings will find adequate forms at the stationer. Withholdings may be figured according to wage-bracket tables furnished by the Treasury Department or by using a revised method of percentage computation. Taxpayers should find the withholding tables easier to handle. These tables are procurable from the tax office. The revised method of percentage computation authorized by the government is involved and errors may result. Using the tables, the taxpayer has merely to run down the column to the wages paid, then across to the withholding exemptions claimed, and there is the deduction authorized.

Amounts paid for traveling or other bona fide expenses are not wages and are not subject to withholding. Be sure to identify such payments as expenses, preferably by giving a separate check properly earmarked. If wages and expenses are combined in a single payment, indicate the separation.

Pensions and retired pay are generally considered wages. However, amounts paid an employe upon retirement which are taxable as annuities are not wages subject to withholdings. Vacation allowances and dismissal pay are wages.

If bonuses, commissions or overtime pay are paid at the same time as regular wages, the tax to be withheld must be determined as if the aggregate of the supplemental and regular wages were a single wage payment for the regular payroll period. If supplemental wages are paid at a different time, the employer may determine the tax to be withheld by aggregating the supplemental wages either with the regular wages for the current payroll period or with the regular wages for the past preceding payroll period within the same calendar year.

Some warm air heating dealers and sheet metal contractors are still handling withholdings so that they are not readily checkable, which is bad business, even though their returns to the Collector are accurate. Withholdings will be a long time with us, probably for all time, and the more the records pile up, the more difficult it will be to audit them. So, simplify the routine as much as possible with due regard for accuracy, of course. The Commissioner does not prescribe any specific forms, but they must make easy reading for auditors. Members of this industry will also find it necessary to check back, and the more comprehensive the recordings, the easier this task.

A check stub detailing wages, deductions and net wages is a big help to accuracy. Duplicate the listings on the face of the check and this automatically provides a receipt for withholdings, a valuable record in the event of subsequent controversy stemming from the employe or the government. Where payrolls are large, there are sure to be such controversies from time to time. Where payrolls are small, the hazard is less, but checks are easier to audit and in the event of a government check-up you have a definite proof of payroll transactions. Cash payment of wages is unwise today.

Arnold Kruckman's

Washington Letter



The National Budget — "Compensatory Economy"

THE President's recent Budget submitted to congress is unique. It introduces for the first time the suggestion that the government formally participates in the control of the nation's budget. The budget message discusses the Federal budget, which is the outgo and income to run the Federal government, and analyzes the budget of the nation (of which you and I are a part), apparently to define how our personal outgo and income can be supervised to keep business and industry going at such a level that everybody capable of working can earn enough to live comfortably and have no worries about depressions and other factors that upset our economic and social life.

The general debate about this revolutionary proposal already has started and is usually clothed in extremely broad or vague terms, or in the polysyllabic language of technology—the technology of finance, mathematics and sociology. You may clearly understand the esoteric verbiage of the modern dialecticians, but generally it is all Greek to ordinary people, including apparently many business men of our acquaintance.

Compensatory Economy—Managed Economy

Messrs. Keynes, Hansen, and Beveridge, setting the pace for the President, call it a "compensatory economy." You may recall some 1,300 or 1,400 years ago the philosophic dialecticians, who were part of the New Deal of that day, gathered from all parts of the then civilized world to discuss how many angels might dance on the point of a needle. The subject was, at that time, just as serious to the world as "compensatory economy" is now deadly serious to our world. The point to bear in mind is that the abracadabra of the alchemists of the Middle Ages sprang from motives just as earnest, honest and sincere as the word-compounds that reach our misty minds from the genuinely fine thinkers of this day, although it may seem to our more obtuse perceptions that they sometimes appear to split zeros. For instance, this "compensatory economy," to the over-simplified mind of a layman, does not seem in essence different from a "managed economy," albeit the term "managed economy" has left a distaste as the result of its recent associations and implications.

In the simplest terms the "compensatory economy" of the suggested nation's budget appears to work something like this: You sell time, knowledge, services, raw materials, products, tangibles or intangibles,

and you earn an income. Some of us will earn more than we spend. The fiscal philosophers realize the surplus will be saved, hoarded, as funds or in some other form that has relatively permanent value. This surplus, which belongs individually to many millions, collectively lies inert, idle, of no value to anyone except its owner as a reserve. The socio-fiscal philosophers have coined a new word for this accumulation; they call it "leakage." They mean it has leaked out of the circulatory system of the world's economy, and they insist it must be forced back into the bloodstream of the economy to keep this surplus busy in maintaining the jobs and welfare of those who have no surplus to fall back upon when there are depressions or other lapses from prosperity. This is where Henry Wallace's 60,000,000 jobs come in.

Obviously, the "leakage" would be remedied by putting the funds to work through the usual outlets of banks, and by subsidies for farmers, for small business, and by spending it on projects such as the 15 or 20 additional TVA's which have been under discussion, and many other enterprises in public works. The actual number of things that might be done with the "leakage" make a considerable catalog. The President has intimated it might be used to improve everybody's health and to assure everybody better food, and to make more education and better education available to more people. He thinks it might be used to give Social Security to more people, to people who are now ineligible.

How to Get Full Employment

The details about how it may be done have been suggested in the reports of the Temporary National Economic Committee—TNEC—and the National Resources Planning Board. These reports and studies have had wide consideration among the cognoscenti, the experts in sociology and finance; but they have not sifted down much to the ordinary taxpayer. They have had one notable effect—they have provided the background for the bill introduced in the Senate January 22 by Senator Murray, New Dealer, from Montana, who heads the Small Business Committee, on behalf of him and Senator Wagner, another New Dealer, of New York, Senator Thomas of Utah, and Senator O'Mahoney of Wyoming.

The bill outlines how full employment can be provided after the war by "a budget for the nation," the Federal government to take over the function of forcing surplus savings into investments. The pro-

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gram is called "National Production and Employment Budget." It provides for the establishment of a planning bureau to make the program work. The bureau is to be an arm of the Executive Offices and is to be entirely free of the present Bureau of the Budget. We would thus not only get another Budget Bureau, but we would have the machine which would plan, budget, and program what we—persons or corporations—must do with our savings, and would look after the investment of those savings (with Government probably on the boards), these investments logically determining the direction our business and industry and social life would take in the future.

The Key Murray Bill

The Bill starts its text by enunciating the policy of the United States as the desire to "foster free competitive enterprise and the investment of private capital." The Chamber of Commerce of the United States issued a printed statement on January 29, discussing the Bill, and made this comment: "Much of its support comes from those who agree that we are suffering from a mature economy (i.e., an over-ripe economy) in which the driving force for private capital expansion no longer exists; that we are suffering from a permanent excess of money savings, and that business enterprises are no longer dependent to any extent upon the investment markets for funds with which to expand productive capital.

"On the basis of these premises, it is assumed the President, in submitting the proposed 'National Budget,' would find estimated private investment to be inadequate to assure 60,000,000 jobs; that he would recommend various measures, such as the licensing of corporations proposed by the TNEC, and other methods to bring private industry under more complete control; and that general legislation of this nature would be supplemented by a vast spending program, including public works and expanded government activities in such fields as social security, housing, nutrition, and education.

"In a speech before the American Statistical Association in Washington, December 27, Henry A. Wallace said: 'Jobs for all will be the economic battle cry of all peoples of the world for the next 20 years. I find in this proposed bill something that has been lacking in most of our postwar planning, namely, a clear understanding of the necessity for active interplay between the executive and the legislative branches of our Government.'"

Who's Backing Murray Bill

The President's budget presents a statistical table called the "Government's Budget and the Nation's Budget," which is taken here as a specific indication that the President accepts the philosophy of the "Nation's Budget" and wishes to emphasize that he will support Senator Murray's "Full Employment" bill. If the bill is enacted, the nation will pass under "compensatory management." It is as easy and simple as that. The Liberals here hold that the Murray bill and the President's budget embody the aims the administration will fight for all along the line.

Neither those in the councils of the White House nor in active sympathy with the program will predict what Congress may do. They think the President will get approximately the legislation he wants on each point unless the public opposition is so great that the Congress will be afraid to act. Presumably, CIO

and AFL and other labor interests support the Murray bill. The farmers are expected to be cautious, and smaller business is regarded as inclined to support the bill because it will make borrowing of funds easier for business in this category.

The Finances Behind the Budget

Before discussing the place of RFC in this program it may be clarifying to summarize the figures upon which the President rests the budget for the nation. In 1939 consumers earned (minus personal tax payments) \$64,900,000,000. They spent \$59,300,000,000, saving \$5,600,000,000. In 1944 they earned \$127,500,000,000, spent \$91,700,000,000, and saved \$35,800,000,000. In 1939 business gained \$7,900,000,000 in undistributed profits and reserves. It spent for capital expenditures \$10,500,000,000, leaving a net deficit of \$2,600,000,000, either borrowed or drawn from previously accumulated reserves. In 1944 business gained undistributed profits and reserves totalling \$10,700,000,000; it spent \$1,000,000,000 on capital needs, and kept \$9,700,000,000. State and local governments had a deficit of \$200,000,000 in 1939 and a surplus of \$1,600,000,000 in 1944. The Federal government received an income of \$6,900,000,000 in 1939 and spent \$9,700,000,000, having a deficit of \$2,800,000,000. In 1944 it collected \$48,900,000,000, spent \$96,000,000,000, and was compelled to make up the deficit of \$47,100,000,000. The over-all, gross income of the consumers, business, state and local governments and the Federal government in 1939 totalled \$88,600,000,000. In 1944 the over-all gross amounted to \$197,500,000,000.

To insure full employment, within reason, on the basis of 1939 prices, the gross product must go up 50 per cent over 1939, to a gross over-all of approximately \$133,000,000,000. But since the consumer, the individual, like the squirrel, is inclined to salt some of it away for the untoward day, it seems certain there would be more capital on the market than industry could employ for new undertakings. The Federal government would, therefore, have the job of keeping this stagnant accumulation in circulation on many projects. In 1939 the Federal government spent only 11 per cent of the national expenditures; in 1944 it spent 47 per cent. The fiscal planners have convinced the President that if the Federal government cuts its expenditures much more swiftly than the rest of the economy increases its expenditures, there may be unhappiness. This is the thought that leads to more TVAs, home building, more highways, more airfields, more everything which may justify the government bonds to cover the expense.

How the Money Will Be Raised

Bonds suggest banks and fiscal institutions and machinery. Two ideas are offered in connection with this phase. Some of our government friends tell us if the taxpayer can get his mind absorbed in consideration of the "Nation's Budget," then he will not worry about the unbalanced Federal government budget. The second idea is simple: the use of RFC as the big post-war pump-primer would get around the regular budget. The vast loans necessary would not show up either as expenditures or as deficits. Ordinarily RFC borrows its funds in the open market instead of following the present custom of taking it from the Treasury. When RFC gets its funds outside of the Treasury, its transactions show only as part of the debt guaranteed by

(Continued on page 119)

You Must Get Adequate Gross Profit To Compete in the Post War Market

By Charles R. Bennett*

THE failure rate in the furnace business is much too high, reaching, some authorities claim, in normal peacetimes $33\frac{1}{3}$ per cent per year. There are many reasons for this high rate of mortality, some of the major reasons being as follows:

- Too little initial capital.
- Lack of sufficient sales volume.
- Expenses too high.
- Loose credit extension to customers.
- Sloppy work.
- Poor service.
- Lack of knowledge.
- Laziness.
- Poor cost and accounting systems.
- INADEQUATE GROSS PROFIT.

Twenty years' experience in checking hundreds of heating businesses has convinced me the most prevalent reason for bankruptcy or failure is LACK OF ADEQUATE GROSS PROFIT.

The common practice is to price a furnace job like this:

Cost of furnace and fittings.....	\$150.00
Labor (guessed)	40.00
Overhead at 10 per cent of above.....	19.00
Sales commission at 10 per cent of above.....	20.90
Profit at 10 per cent of above.....	22.99

Retail selling price..... \$252.89

\$252.89 minus \$150.00 equals \$102.89, or a gross profit of 40 per cent of retail selling price of \$252.89.

This gross profit of 40 per cent of the selling price is not adequate unless the dealer is in a low price labor area, or the dealer is a man who can operate his business with such a low gross profit by doing most of the work of selling, installing, service, collection, and management himself. Note that above costs are not figured on the retail sales price. All costs should be figured on a percentage basis using the selling price as a base.

Other businesses, like a furniture dealer's, for example, do not operate on such a low gross profit, and they do not have labor and service expenses to pay out of their gross profit like we in the heating business do. A furniture dealer figures his selling price: Cost of furniture (including freight and dray

to his store)..... \$150.00
Markup 100 per cent..... 150.00

Retail selling price..... \$300.00
GROSS PROFIT = 50 PER CENT.

*Editor's Note—C. R. Bennett has been with Chicago WPB for the past two years but for 10 years was Assistant Sales Manager for Holland Furnace Co.; for 5 years Vice-president and Sales Manager for the Landwehr Heating Corp., Philadelphia; for 3 years a branch store manager with Kalamazoo Stove and Furnace Co.

Hundreds of successful furnace dealers price their jobs:

Furnace and fitting cost.....	\$150.00
Markup of 100 per cent.....	150.00

Retail sales price.....	\$300.00
GROSS PROFIT = 50 PER CENT.	

Such successful heating dealers simply double the cost of materials in order to have a 50 per cent gross profit. In small towns, furnace dealers can operate on a 45 per cent gross profit because of lower overhead and labor costs. On the other hand, in big cities it is necessary to operate with a gross profit of 55 per cent because overhead and labor costs are higher.

Extraordinary expenses like digging pits, going through cellar walls, exposing stacks, long traveling distances, rock wool insulation of pipes through cold spaces, etc., must be added over and above these gross profits of 45 to 55 per cent.

With adequate gross profit, a furnace dealer can have a store in a better location where he can have a better place to display his merchandise. He also can employ a sales force and pay them an adequate sales commission. This will hold a sales force. With a modern store in a shopping part of the town, he can sell package merchandise like stoves, heaters, refrigerators, deep freeze units, etc., from his floor (his girl can sell a lot of this merchandise), and thus make profits in the dull winter months which do not show profits in the heating business.

Too Cheap-Quick Bankruptcy

Too many dealers sell furnaces on a price basis. A lower gross profit is necessary when selling furnaces for new houses, but an adequate gross profit of 45 to 55 per cent is absolutely necessary when selling furnaces in old houses. Too many unforeseen costs are run into to sell furnaces on a small gross profit in old houses. In old house work, when furnaces are sold on an inadequate gross profit basis, failure of the business is inevitable. New house business can be sold at *only* a slightly lower gross profit than the old house business.

If you have been selling furnaces on too small a gross profit, in other words, on a price basis depending upon what your competitors have been quoting, you must introduce salesmanship to get an adequate gross profit. You must pay no attention to what your competitors are quoting. Develop a sales presentation which will sell jobs for you which will give you a fair adequate gross profit.

With a gross profit of 50 per cent you can proportion your expenses on a percentage basis and show a

(Continued on Page 115)

Interpretations, Amendments, Easements To Existing Orders

Heating "Essential"

THE War Manpower Commission has announced a list of *essential* and *critical* activities to be used by Selective Service as a guide in the induction of men in the 26 through 29 age group, in accordance with the directive issued Jan. 15 by James F. Byrnes, director of War Mobilization and Reconversion.

All activities in this list are *essential* activities. Those activities in capital letters are *critical* activities. With one exception, no attempt has been made to indicate the relative importance of different occupations in these activities. ALL TECHNICAL, SCIENTIFIC and RESEARCH PERSONNEL engaged in any of the activities in the list, whether or not the activity appears in capital letters or small letters, are regarded as being engaged in critical activities.

Some activities included in this list are limited to the *production* of essential products, but for the heating and sheet metal industry both production and installation and repair or maintenance services are also considered as *essential*. The classifications are arranged by groups—most of our industry is covered in group 31, "Repair Service," which says:

31. Repair Services.—IN-PLANT MAINTENANCE and REPAIR OF INDUSTRIAL and MINING MACHINERY AND EQUIPMENT; repair of vehicles, such as bicycles, motorcycles, AUTOMOBILES, BUSSES, TRUCKS, TRACTORS AND FARM EQUIPMENT; TIRES; typewriters and business machines; elevators; shoe repairing; sewing machines; radios; refrigerators; clocks and watches; harnesses; tools; stoves; pneumatic tube systems; power laundry equipment; electric appliances and motors, engines, *heating equipment*; scientific, commercial and industrial weighing machines; farm and other industrial and scientific equipment; welding service; *roofing*, and electric, gas and *plumbing and heating installations in domestic, commercial, and industrial buildings*; building alteration, maintenance and repair; installation of insulating material; blacksmithing; armature rewinding; locksmithing. (IT IS INTENDED THAT CONSIDERATION BE GIVEN ONLY TO INDIVIDUALS QUALIFIED TO RENDER ALL-AROUND REPAIR SERVICES ON THE TYPES OF EQUIPMENT SPECIFIED HEREIN.)

It may also be that group 9, "Construction," will classify as *critical* all our workmen engaged in maintaining and constructing "approved industrial plants" and "military projects" and that group 15 will classify as *critical* all workmen engaged in *producing* "blowers, exhaust and ventilating fans and stokers."

Sheet metal shops fabricating parts under group 1, "aircraft parts"; group 2, "ships, boats and parts"; group 3, "ordinance and accessories"; group 4, "ammunition"; group 6, "processing of food"; group 28, "communication equipment," should find their workmen classified as either *critical* or *essential*.

There has been no change in the status of the usual workman in a furnace or sheet metal shop—repair services for heating equipment is *essential*. This affects all dealers.

Warehouse Order M-21-b3

A NEW steel warehouse order M-21-b3, effective February 1, 1945, eliminates certain features formerly in orders M-21-b-1 and M-21-b-2, which have been revoked.

The new order includes elimination of base tonnages and warehouse certificates on general steel products and a new requirement to set up an internal record of the replaceable tonnage sold from stock as compared with tonnage ordered. Separate records must be established for general steel products and merchant trade products.

The new order changes the endorsement required of distributors on their stock replacement orders, making it necessary for each order to be identified as a general steel product replacement order or as a merchant trade product replacement order. Certification must also include the standard endorsement authorized in Priorities Regulation No. 7.

A Steel Distributors Declaration of Intent is also required under the order from certain distributors to determine whether they are operating as distributors under the order or as resellers under Direction 48 to Controlled Materials Plan Regulation No. 1.

Furnace Price Adjustment

INDIVIDUAL adjustment provisions applying to manufacturers' maximum prices for a number of building materials have been incorporated in a single order and separated from similar provisions relating to manufacturers' prices for consumers' goods.

The new order, which becomes effective February 7, 1945, provides producers of the building material with a uniform adjustment procedure with all provisions contained in a single document.

In addition, the new order (B-1 Under Maximum Price Regulation 188) includes other building materials commodities for which no individual adjustment provisions were previously provided. These commodities include some large items, such as furnaces and repair parts and air conditioning units, and numerous smaller items—all listed in the new order.

Provisions governing the amount of relief granted under Order B-1 are similar to those used in the handling of cases where the applicant is selling under contract or subcontract to specified government agencies. They are also similar to the adjustment provisions contained in a number of other OPA price regulations.

Two general groups of building material commodities are classified in the new order: (1) mechanical equipment, such as sheet metal work, furnaces, etc., and (2) mason materials, refractories, roofing and insulation material.

Following are the factors that will be taken into consideration by OPA in acting upon applications for adjustment under the new order:

- Whether the adjusted price will be higher than
(Continued on page 112)

What's Happening to Social Security Funds

(Reprinted from *Business Action—Nat'l Chamber of Commerce*)

Since the collection of contributions for old-age and survivors' insurance began in 1937, total receipts have exceeded benefit payments by about 10 times. Today the reserve fund "contains" about \$6 billion. Where is this fund? Who has the money?

EMPLOYER and employee contributions to the old-age and survivors' insurance program since 1937 have gone into a reserve which has been spent for ordinary government purposes, including the cost of war.

These tax payments proceed to the United States Treasury and then *out* to public employees and persons and businesses with whom the government carries on transactions, and a small amount to old-age beneficiaries.

For 1944, tax payments were \$1.4 billion. That sum plus the interest "earnings" on the reserve fund, which raised the total to \$1.52 billion, was paid out; \$2 billion to beneficiaries and \$1.32 billion for other government operations.

Fund Grows

While all this was going on, the Treasury, according to law, credited to the old-age Trust Fund all taxes levied under the law and about 2 per cent interest "earnings"; interest is credited because the Treasury "borrows" the tax money from the Trust Fund. Thus there was added to the Trust Fund about \$1.52 billion, offset by the \$200 million paid to beneficiaries, causing a net increase in the Fund of \$1.32 billion for the year. This left a "balance" in the Fund of about \$6 billion.

If the government spends all the tax receipts currently as they come in, then the government must levy another tax some time in the future after the benefit load has exceeded the current income of the Trust Fund for a time.

This means double taxation and is unfair, it is frequently charged, to employers and workers who each pay the current 1 per cent levy. Then, the conclusion is drawn that we should adopt a pay-as-you-need tax schedule, just enough to meet the legal requirements of eligible beneficiaries.

But this conclusion does not necessarily follow. True, when benefit payments exceed current collections (some years hence), then the government will have to tax its citizens generally, in order to assure enough funds in the Treasury to meet the beneficiaries' claims, but there will not be a new levy on employers and workers covered by the program.

Building up a sizable reserve account does not cause double taxation. The cause of taxation is government spending. Had the government not used the inflowing funds from the old-age tax on employers and workers, in earlier years when income exceeded benefit payments, it would have had to levy other taxes to meet its outgo at that time (or borrow the money, which is postponed taxation).

Double Taxation?

Thus, the funds from the old-age tax, say 1937 to

1960, reduce other taxes by the amount of the payroll tax receipts in excess of benefit payments; but since, instead of relying on other tax money, the government used the old-age funds, we cannot assert that in subsequent years when the government must replenish the Trust Fund that this means double taxation. The existence of the old-age program and the Trust Fund explain why the funds must be raised once, but do not account for any doubling of taxation.

If, over the next 25 years, the old-age program is jointly financed by employer and worker as now, and an average of \$3 billion benefits is paid annually, then \$75 billion, less interest earnings, will have to be raised in this way. The fact that the government used the excess income, when there is an excess of taxes over old-age payments, in no way increases the amount which must be raised for old-age purposes.

The fact that the government used the old-age money for a time for other purposes merely means that this tax money took the place of money which would have had to be raised otherwise, had the government not had access to these reserve funds.

Because this program is very new, only a few people have reached retirement age; therefore, the 2 per cent tax revenue exceeds outgo. After another generation, the program will "grow up" so that, except for population and statutory changes, the number of newly-covered workers and the number reaching retirement age will be about equal every year. Then, if we adhere to a collect-as-you-spend program, the collections and benefits will about equal each other.

Increasing Liability

Present tax rates are scheduled to rise to a total of 6 per cent by 1949, but even this figure, it is generally agreed, will not finance the present scale of benefits. Therefore, the accumulating reserve will not even meet the ultimate costs. For this reason, many persons, anxious to adhere fully to joint contributory financing, are inclined to encourage the gradual increase of the tax rates to the full 6 per cent by 1949.

Letting the rates rise does not mean higher taxes; it means that some other tax levies need be less high for the time being because any old-age tax revenue not needed for benefits will be used for general purposes by the government and thus perhaps our personal income or corporation taxes can be that much lower.

The chief argument for the Trust Fund procedure and for building a reserve while the program is maturing is that it helps to focus attention on the rapidly accumulating liability of the fund and therefore helps to keep the program on a sounder basis, financed jointly through adequate contributions by employers and by the workers who are the beneficiaries.

NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION



Says

Advertising Program Designed To Help You

THE fulfilment of the proposed national advertising program will result in increased sales and improved installations in our industry when we return to more normal conditions. We refer to improved installations, because dealer training and education, using the newly released sections of the textbook, "Practical Warm Air Heating," is a definite and important part of the over-all program.

The success of the program is dependent upon the participation of the dealers, jobbers, and manufacturers in our industry. Manufacturers have subscribed a substantial amount of money, but we need a minimum of 1,000 dealers and jobber subscriptions to reach our objective.

How You Can Help

We are asking all subscribers—manufacturers, jobbers, and dealers—to obtain as many subscriptions as possible. We are asking you to obtain as many dealer subscriptions as you can from the dealers in your community and territory by any one of the following methods:

1. If you have a local or county association, call a meeting through the proper authority in the association, for the purpose of discussing the Proposed Advertising and Educational Program.
2. If you do not have a local or county association, set a date and place for a meeting, and write a letter, or telephone, or both, inviting the dealers in your community to attend.
3. Contact your jobbers and ask them to assist you in calling a dealers' meeting, and also have the jobbers' salesmen in attendance at the meeting. Jobbers' salesmen can obtain many subscriptions in their contacts with dealers.
4. Meetings with a good number of dealers in attendance represent the quickest way to obtain subscriptions. Also, please use every effort you can to obtain individual subscriptions.

The proposed program is YOUR program. It is designed to help YOU and all other segments of the Warm Air Heating Industry.

Cost Is Nominal

Never before in the history of the Warm Air Heating Industry has such a program been offered, and never before have warm air heating dealers had an opportunity to participate in and become a part of a National Advertising, Publicity, Sales Promotional, Training, and Educational Program.

The cost for a dealer's subscription, of from \$50.00 to \$150.00 depending upon your 1940 sales, is probably much less than the annual insurance premiums on your life, your property, workmen's compensation, and other forms. Yes, and in many cases, it is less than the Union dues paid by employees in some of the Union shops in the industry. Yet, in large measure, whether or not you can pay premiums on the various forms of insurance which you carry, depends upon the success of your business and the success of the Warm Air Heating Industry in general.

Executive Board Meeting

A special meeting of the Executive Board of the Dealers' Division was held in Cleveland on January 5 and 6. At this meeting, the basic objective which was discussed and unanimously adopted, was to obtain a minimum of 1,000 dealer and jobber subscribers to the program and to bring about a substantial improvement in warm air heating installations. A plan to carry out the objective of improved installations is to be put into effect as soon as conditions permit, through a series of Dealer Schools to be sponsored by the Dealers' Division.

The Executive Board of the Dealers' Division also expressed a desire to work with existing National, State, and Local Dealer Associations and organizations; and also that as soon as conditions permit, a man who knows and understands the warm air heating dealers' problems intimately, and who can conduct Dealer Schools, be engaged to give all of his time to the Dealers' Division.

Because this was the first meeting of the Executive Board since its formation on December 14, 1944, it was felt an exchange of ideas and information of the objectives of the Dealer Division would be necessary before a program of subjects could be discussed.

First Dealer Objective

Finally, after much exploration, the Board unanimously passed the following resolutions:

1. Hold at least five (5) test Dealer Educational Schools as soon as possible. The Board decided that a definite date for these schools should not be determined by them, and that it was up to the Chairman and Co-Chairman of the Educational Committee to set the dates and places for the School. However, everyone seemed to be generally agreed that the Schools should be held before the first part of June.

At the five or more test schools, dealers, salesmen, mechanics, and everyone interested in the industry will be invited. Furthermore, *dealers and their employees do not have to be members of the dealers' division to attend the schools.* At each school there should be manufacturers' representatives who attended the Clinic at Urbana on February 1 and 2. Also, the schools be held in cooperation with the Installation Codes and Publicity and Merchandising Committees. It was also recommended that a registration fee, to cover local expenses and a dinner, be charged for each person who will register for the schools.

2. Jack Stowell of Aurora, Ill., was nominated and elected as Chairman, and George Kalvog, of Chicago, as Co-Chairman of the "Educational and Codes Committee" of the Dealers' Division. It was decided that they select the members for their committee.
3. That a letter be sent to manufacturers and jobbers asking for a list of their dealers in the U. S. who sell one or more furnaces. Also, to

ask that these lists be checked as to which dealers would be recommended to act as Chairmen and Co-Chairmen in each community for the purpose of increasing the dealer memberships in the Dealers' Division, to aid in carrying on training and educational activities, and for the proposed Advertising Program.

4. That manufacturers and jobbers be urged to have their salesmen contact their dealers to subscribe to the training and educational program and the proposed Advertising Program.
5. Dan Schmidlin was elected as Chairman, and Ray Turnbull as Co-Chairman of the Membership Committee of the Dealers' Division.
6. Write to all present dealer members urging them, with the help of the jobbers in their communities, to obtain additional members.
7. Any multiple branch organization will be requested to subscribe to the educational and proposed Advertising program for each retail branch, in accordance with the existing schedule of subscriptions for dealers.

Contract Termination for Small Plants

A RECENT survey on contract termination made for Smaller War Plants Corporation in New England shows that many small plants are confused concerning the problems of contract termination.

The Corporation has already aided many small plants in preparing for contract terminations. But the work already done is just a beginning and much more remains to be done to ease the ultimate blow.

Indications point to the fact that plants which have registered with Smaller War Plants Corporation excel the unregistered plants in their knowledge of contract termination problems and the necessity for anticipating them. The survey indicates that plants which are registered with the Corporation are doing about twice as much to prepare for terminations as plants which are not registered.

The job on contract termination which confronts the Corporation is complicated by the fact that many small plants do not keep adequate accounting records. Furthermore, less than 40 per cent of the plants surveyed had taken the trouble to find out whether their contract contains a termination article which will protect them in the event of termination.

A total of 1,081 plants were covered in the New England study. A little more than half had previously registered with the Corporation. In the metal-working industry, almost two-thirds of the plants sampled were registered with the Corporation. Practically all industries except manufacturers of steel, agricultural machinery, food, and tobacco were represented. More than 90 per cent of all plants contacted employed less than 250 wage earners.

Certain observations can now be made from the answers to the many questions on contract termination presented to these plants.

New England is especially characterized by the existence of old established industries and firms producing the same products as they did in peacetime. However, many industries, particularly the metal-working industry, anticipate radical change-overs. They look forward to making new products, employing the crafts and techniques learned during the war.

Their reconversion problem, which starts with the termination of their war contracts, is therefore highly complicated. Small plants which have not heretofore had adequate access to research and new developments are going to need help in gaining an equal competitive footing with big business in the postwar years.

It is a first essential for these small plants that their termination claims be settled quickly. Money tied up in a termination claim is needed to convert to peacetime production. Experience in terminations to date proves conclusively that unless plants have prepared adequately for terminations, their claims are not settled for many months.

There are many steps which can be taken to prepare adequately for terminations. Separate accounts should be kept of all contributing costs. All verbal commitments from the Government or prime contractors must be reduced to writing. It is discouraging, but important, to learn that somewhat less than half of the plants surveyed had not even kept themselves informed of Government regulations relating to the disposal of inventories.

In its survey, the Smaller War Plants Corporation inquired into the probable financing requirements of each small plant. Although a very large proportion felt they would not need financing during the reconversion period, it may be that these small plants did not adequately appraise the difficulty which they will encounter. They are now doing a much larger volume of business than in normal times. Impressed by the dollar values of goods and contracts which they are handling and fully occupied with their operating activities, many of them failed to give adequate consideration to such factors as the impact of the wartime tax rates, the effect of renegotiation, and the fact that their working capital is almost completely tied up in the time and complexities involved in getting back to civilian production. Even a short lag between termination of war contracts and resumption of normal production will cause these small plants to dissipate their cash resources in trying to hold a skeleton labor force and keeping their plant open and operating.

On Our Industry's Front

OPA Annual Reports

SHORT forms used to make annual financial reports have been mailed to about 37,000 corporations in 48 states, almost double the number covered last year, says OPA.

Form A, for the annual report, and Form B, for interim reports made every quarter, were revised last year as a time and effort-saving measure. Form A was reduced from 19 to four pages, while Form B was shortened to three pages. The same condensed forms, with only minor changes, were issued this year after approval by the Bureau of the Budget.

Business men are requested to fill out and return two copies of the forms as quickly as possible. Form A should be returned within three months of the end of the firm's fiscal year, and Form B within one month of the end of each quarter. Only companies receiving forms from OPA are asked to submit reports.

Both forms ask for a statement of profit and loss and an analysis of sales. The annual report requires, in addition, a balance sheet and summary of surplus and surplus reserves.

Stoker Situation

THE major cutbacks in materials allocated under the "spot" plan for the first 1945 quarter are: carbon steel—250,000 tons to 150,000 tons; alloy steel—25,000 tons to 10,000 tons; copper—1,500,000 pounds to 500,000 pounds. Because of this Class B stoker production is affected but the severest pinch now is the shortage of foundry castings, which in a large part is due to manpower shortages in the gray iron foundries. There seems to be plenty of raw material. Other bottlenecks pale into insignificance when compared with the castings situation. It is obvious that the anticipated production of Class B stokers in the first and second quarters of this year will not be achieved, either through the regularly scheduled program or under PR 25, or a combination of both.

On Class A stokers the vast majority of manufacturers are still considerably behind on orders and with the manpower pinch and the slow delivery of castings, it appears that this situation will not be alleviated for some time to come.

Taxes For Small Firms

ATAX program designed to help small businesses during the reconversion after the war has been approved by trustees of the National Small Business Men's Association.

The group recommends immediate amendment of the tax laws to provide deferment of corporation excess profits taxes to the extent they are offset by expected tax credits and an increase in the exemption on excess profits from \$10,000 to \$25,000. For the more distant future they propose general revision of taxes

affecting business and the elimination of tax exemptions given cooperatives.

Many small manufacturers will be in bad financial condition when the war contracts are ended. The cases of some will be hopeless. Many of these small companies have piled up big tax liabilities and invested heavily in inventories and equipment, including machinery. Many of these companies will have heavy reconversion costs and many will not be in a position to borrow from banks while they have uncompleted contract terminations.

To avoid a depression it is essential that these companies maintain their payrolls. One way to retain necessary capital in a small business is to allow companies to defer payments on excess profits taxes in an amount equal to estimated tax credits. Under the present law excess profits taxes must be paid at once as they come due. It would take probably several years to get a refund on the tax credit.

Under the tax deferment proposal companies would operate on funds which would come back to them as tax credits several years in the future. As it now stands, many small companies actually are operating on funds which they have accumulated for income taxes. The fact that they have one customer—the government—with a grade A credit rating makes this possible.

Raising the excess profits exemption from \$10,000 to \$25,000 would give small business the opportunity to grow that all companies had up to eight years ago by reinvesting their earnings. Whatever business pays in income taxes it collects from its customers—the public. Business should not be a tax collector for the government; such taxes as are now hidden in income taxes should be brought out in the open and collected directly by the government from individuals.

Materials Situation

ALTHOUGH Priorities Regulation 25, the "spot authorization" order, has not been revoked, its use has been drastically limited by military needs, and activity under it must be sharply restricted until the present tight production situation loosens up, warns WPB.

Summarizing the current situation:

1. The allotments and authorizations that have already been granted have not been cancelled.
2. However, because of shortages it is unlikely that mill orders for steel, copper in most forms, and aluminum sheet placed under PR-25 will be filled during the first quarter and perhaps during the second.
3. Spot authorizations still can be approved to utilize any amount of idle and excess material provided the applicant has available facilities and labor. New allotments of steel will be limited to not more than 10 tons of carbon and two tons of alloy steel to "piece in" idle and excess materials.
4. Two additional severe limitations on PR-25 are:
 - (a) Field representatives of Army, Navy, War Manpower Commission and the War Production Board in all areas of critical labor shortage, plus 44 in other areas centering about major manufacturing cities,

were ordered by this document to grant no spot authorizations for 90 days except in unusual cases.

(b) Warehouses, now the best source of new material for "spot authorizations," have been limited in the amount of material they can deliver on "Z" allotments as follows:

Steel—Distributors have been directed to deliver only 10 tons of carbon steel and two tons of alloy per customer each quarter, and customers are limited to a total of those amounts on "Z" allotments. "Z" allotment orders may still be placed with mills, but it is extremely unlikely that they can be filled because regular Controlled Materials Plan orders come first. "Z" orders on mills are not limited in tonnage as are the allotments to be filled from warehouses.

Copper—Purchases of brass mill products from warehouses under PR-25 authorizations are limited to 200 pounds per quarter.

5. A manufacturer who has a "spot authorization" is prohibited from ordering more than these amounts from warehouses in any quarter. These new restrictions are contained in Direction 6 to CMP Regulation 4, which was announced recently.

Stainless Frozen

FILLING of orders for stainless steel subject to deferred allotments and the filling of orders to build up warehouse inventories of steel are prohibited temporarily, under Direction No. 62 to Controlled Materials Plan Regulation No. 1, announced WPB January 29.

Under the new rules, after January 30, 1945, no producer may produce or deliver any stainless steel on orders identified by a Controlled Materials Plan allotment symbol the initial letter of which is Z (Z-1, Z1E, Z-2, etc.). These are the deferred allotment symbols assigned by WPB in connection with allotments of steel for production of civilian type goods under the spot authorization procedure contained in Priorities Regulation No. 25.

Similarly, after the same date no producer will be permitted to deliver or produce any steel on orders bearing the CMP allotment symbol ZW placed under Direction No. 3 to Order M-21-b-1. This symbol has been permitted for use by warehouses in building up their inventories of steel.

This action is required because of the present critical shortage of most steel products; however, authorizations to place orders of the type covered by the new rule, which is contained in Direction No. 62 to CMP Regulation No. 1, will not be generally cancelled, so that they may be promptly reinstated when the supply situation permits.

End War Agencies

LIQUIDATION of war emergency agencies within a year after cessation of hostilities is part of a 12 point program offered for the preservation of small business by the Illinois legislative commission on small business.

The commission, created in the 1943 general assembly and composed of 10 members from the house and senate, says the problem of preserving small business must be solved by a national concerted attack on bureaucratic controls after the war is ended.

The commission report also recommended:

"Take those vital powers which may decree life or death over private enterprise out of the hands of appointed bureaucrats and restore them to our elected representatives in congress, where they belong.

"Revert to the constitutional requirements that laws, orders, restrictions, and directives shall be enacted by law instead of by decrees promulgated by bureaucrats, who are not directly answerable to the people.

"Get rid of, once and for all, the planned economy scheme of nucleus plants, classification of retail stores, grade labeling, and zone distribution."

Building Needs No Prod

THE building and construction industry will require no artificial government stimulation immediately after the war because of the large potential demand for privately financed home and business structures, states Thomas S. Holden, president of the F. W. Dodge Corporation.

Up to Nov. 30, Dodge company's field staff reported that in its 37 state territory 65,565 projects were contemplated after the war at a total estimated cost of \$12,375,490,000. Of these 23,811 were in the designing stage, at a total estimated cost of \$5,946,765,000.

First Year's Work Estimated

Dollar volume of actual new construction in the first 12 months after German resistance ends, however, will likely approximate 1938 volume, \$3,197,928,000, because of material, man power and price control problems, he said.

The public work already planned, if put under contract immediately or soon after the collapse, would tend to crowd out every potential private project on our list.

This is a rigid mathematical interpretation of statistics on plans, but properly viewed it is an illustration of the point that artificial stimulation of public works in the early post-war period can scarcely fail to intensify undue competition with private projects for needed man power and materials.

Fuel Oil Denied

SUPPLY conditions have made it necessary to cut off further applications for fuel oil rations for use in heating equipment reconverted to burn oil, says Office of Price Administration.

OPA's move to halt further reconversions withdraws the opportunity extended last November 4 to private householders and other small volume users in the East Coast and Midwest areas to reconvert to oil burning equipment if they had changed to the use of coal or wood after the first restrictions were placed on fuel oil. It does not affect consumers who have already reinstalled their oil burners under the previous provision, nor does it affect those who have received an advance ration for equipment now being reinstalled. The action will, however, stop any further reconversions except for hardship cases.

Hereafter, individual householders and other small volume users will be eligible for reconversion rations only if hardship can be established.

(Amendment 45 to Revised Ration Order 11—Fuel Oil—effective February 2, 1945.)

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

WATERBURY

The Kind of Equipment You Need
To Build Your Post-War Trade

The GASTITE Furnace
Best Fits Your Most Active Market

We are proud to offer you this furnace—and you will be proud to offer it to your customers. It's moderately priced, well within the reach of the average householder, yet high in quality. It offers exclusive selling arguments which have grass-root appeal—right down to the ultimate consumer. He is the one who really appreciates freedom from smoke and furnace dirt as provided by Waterbury Gastite and Seamless furnaces.

Distributors! An Unusual Opportunity

Our Post-War Sales Policy has made exclusive territory rights available to dealers and distributors in territories not now occupied.

Under the Waterbury name we make a full line, from gravity furnaces to air conditioners, for all fuels, in a full selection of sizes, priced to meet all legitimate competition.

We invite your consideration, if you are so situated as to be able to make the most of a definitely unusual opportunity.



Keeps
Gases and
Dust Out of the
Heat
Stream

THE WATERMAN-WATERBURY COMPANY

1122 Jackson St. N. E., Minneapolis, Minn.



The "How, What and Why" of the New Winter Air Conditioning Manual

BY

S. KONZO*

HOW TO USE IT
WHAT RESEARCH BACKS IT UP
WHY EVERYBODY SHOULD ADOPT IT

How to Figure Heat Losses

ONE hundred fifty brains concentrated on one problem can solve that problem far better than can one brain or the brains of one company. The new Code and Manual for the Design and Installation of Warm Air Winter Air Conditioning Systems is the end result of this first attempt on the part of the warm air industry to seek a common answer.

In the years to come, when new men will have to be trained, when dealer schools will be conducted over the country, when night schools and vocational schools will be clamoring for textbooks and practical handbooks, the industry cannot afford to have 40 or 50 pet methods being taught simultaneously.

Even when it comes to such a simple thing as heat loss calculations we cannot afford to have each and every company pushing some special scheme for doing the work. When our 150 brains approached this problem we kept in mind the following questions:

1. Will the new heat loss method be reasonably accurate?
2. Will it apply to Minnesota, Texas, Oregon or New Jersey?
3. Will it conform to the latest interpretations of the Guide of the American Society of Heating and Ventilating Engineers, and will it be acceptable to their Code Committee?
4. Will it be acceptable to the engineers of the Federal Housing Authority?
5. Can it be tied in with a simple work sheet?
6. Will it be simple?
7. Can one method be used for both gravity and winter air conditioning systems?
8. Will it eliminate much of the estimating and guesswork that has had to be done regarding the temperatures of attic spaces, of the ground below a concrete floor, and of the unheated spaces next to a heated room?
9. Will the method used be similar to those necessary for summer cooling calculations?
10. Will it conform to rigid municipal heating codes?

If the methods you now use personally will fulfill each of the ten requirements just listed, you need read no further in this text. However, if our survey of existing methods is correct, very few former methods will come through such an examination without a

demerit. We offer a method that we will designate as the Manual Method, which will meet each and every requirement we have listed. This is just one step in the SINGLE APPROACH to proper design.

Let's Use B.t.u. Ratings

The warm air industry has come to a point in its development when it can afford to drop obsolete terms, such as "square inches of leader pipe," and to use in its place the unit of "B.t.u. per hour." The term "square inches of leader pipe" has served its purpose, but it has been abused and misunderstood. It is tremendously difficult to get across to a heating contractor that a given furnace may have three different leader pipe ratings. It is almost impossible to get across the idea that when a furnace has a rating of 500 sq. in. that the 500 sq. in. does not stand for the maximum amount of connected pipe capacity of the furnace, but that it really represents a minimum amount. Few men outside of the warm air industry know that a leader pipe rating of "one square inch of leader pipe," is equal to 136 B.t.u. per hour register delivery, only when it applies to a mythical register floating halfway between the 1st and 2nd story, connected to a leader pipe 8 ft. long, and at a register temperature of 175 deg. F. For any other location, length, or temperature this leader pipe rating has no meaning.

Let's forget "leader pipe ratings." There is only ONE universally recognized method of expressing heat losses, and that is the B.t.u. method.

We expect much resistance against any such move that upsets traditional ways. We do want to convince you that your progress in the art and science of warm air heating will hinge very largely upon whether or not you can take this initial step of thinking only in terms of B.t.u. per hour.

Heat Loss Calculations Are Simplified

The method that we have proposed in the Manuals for calculating heat losses is not complicated. Actually, the B.t.u. heat loss per hour for a given wall surface is obtained by multiplying two numbers together. The process consists of the following steps.

- 1) Determining which house surfaces transmit heat, and the area of such surfaces.
- 2) Identifying the construction of such surfaces in a table given in the Manual and finding a Heat Loss Factor given in the Table.

*Special Research Professor, Engineering Experiment Station, University of Illinois.

Give name
of room to
be heated.

HEAT LOSS AND CONSTRUCTION DATA (See TABLE 2 in MANU)

Give location:
basement, 1st
story, or 2nd
story

- Give areas for various exposed parts of room.

B.t.u. item is equal to Factor times Area.

In standard work sheet, space is provided for 12 rooms on one sheet.

A 70 deg. indoor temperature is specified for all rooms, but special rooms are provided with a 20% reserve to simplify figuring.

Line 14 gives the answer that will be used in selection of standard sizes of branch line.

Fig. 3—Part of the Work Sheet showing standard form for figuring heat loss from rooms. Note that the Heat Loss Factor is entered in the second vacant column. These Work Sheets are available in pads of 50 sheets from the National Warm Air Heating & Air Conditioning Ass'n, 145 Public Square, Cleveland.

3) Multiplying the Area by the Heat Loss Factor.

We have by the use of these Heat Loss Factor tables overcome some of the complexities in the usual B.t.u. method. For example, in the usual method, the B.t.u. Loss for a given wall is equal to:

B.t.u. = Area x Coefficient x Temperature Difference

That is, two multiplications are involved.

In the Manual we have combined the last two terms, so that:

B.t.u. — Area x Heat Loss Factor, in which the Heat Loss Factors are given in a Table. Only one multiplication is involved. Also, both numbers are whole numbers and not decimals, so that chances of making errors are reduced. An even greater advantage of this Manual method is that the Heat Loss Factors need be looked for only under *one column of design temperature difference*. It is not necessary to try to estimate temperatures of the ground, of the unheated attic space, of the ground below a concrete floor, etc. All these temperature estimates have been made by us and taken into account.

We show sample pages with extracts from the Manual and the Work Sheets. For complete details we urge you to obtain a copy of the Manual (Section No. 7) from the writer, or from the National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland (14), Ohio, at a cost of 50 cents. One section of the new series of textbooks (Section No. 3) has been written especially for the man who wants to know all the details connected with heat loss calculations.

You will hear more about these Manuals and textbooks, since they are to be used at dealer schools.

short courses, correspondence courses, and vocational schools.

Derivation of Heat Loss Factors

The following discussion is for those engineers who are not willing to accept any suggested method *unless they know the facts*.

In the first place, as previously stated, the heat loss from say an outside wall is usually determined by:

Btu. per hour = Area \times Coefficient \times Temperature Difference. The *Areas* are determined in square feet, as is shown in detail in Textbook Section 3 obtainable from the Association at a cost of 50 cents. The *Coefficients*, or *U* values, are the heat transmission coefficients as given in the ASHVE Guide. Numerical values for the coefficients are shown in the first numbered column of Fig. 2 only as a reference. Note that in practically all cases these coefficients are decimals less than unity. The *Temperature Difference* is the difference in temperature between the two sides of a given construction. In the case of an outside wall, this difference is that between room temperature and outside design temperature. For example, for Chicago, where minus 10 deg. F. is commonly selected as an outside design temperature, the temperature difference is equal to 70 (room temperature) plus 10 deg. or 80 deg. F.

a. For Outside Walls, Windows, and Doors

In those cases in the Manual where outside walls are specified, the HEAT LOSS FACTOR is merely the U value multiplied by the design temperature difference. For example, for an outside frame wall having a U value of 0.25 Btu. per sq. ft. per hr. per deg., the

Table 2a
HEAT LOSS FACTORS

DESCRIPTION	Heat Transmission Coefficient U	HEAT LOSS FACTOR (Multiply values shown by exposed areas in sq. ft.)									
		40	50	60	65	70	75	80	85	90	100
Window		WINDOWS (See Tables in Appendix A)									
No. 1											
(a) Glass, single	1.13	45	57	68	73	79	85	90	96	102	113
(b) Glass, double (storm sash)--tight fitting	0.45	18	23	27	29	32	34	36	38	41	45
(c) Storm sash put up and taken down annually will probably be loose fitting. Under such conditions, recommend using	0.75	30	38	45	49	53	56	60	64	68	75
Door		DOORS									
No. 2											
(a) Doors are figured the same as though they were windows (See No. 1)											
EXPOSED WALLS											
No. 3 Frame											
(a) Frame, wood siding, paper, sheathing, lath and plaster	0.25	10	13	15	16	18	19	20	21	23	25
(b) Same as (3a) substituting $\frac{1}{2}$ " rigid insulation for lath	0.19	8	10	11	12	13	14	15	16	17	19
(c) Same as (3a) with $\frac{1}{2}$ " flexible insulation between studs in contact with sheathing	0.17	7	9	10	11	12	13	14	14	15	17
(d) Same as (3c) with two air spaces	0.15	6	8	9	10	11	11	12	13	14	15
(e) Same as (3a) with 2" blanket or bat insulation between studs	0.12	5	6	7	8	8	9	10	10	11	12
(f) Same as (3a) with 3%" mineral wool or equivalent between studs	0.09	4	5	5	6	6	7	7	8	8	9
(g) Same as (3a) substituting $\frac{1}{2}$ " rigid insulation for wood sheathing	0.19	8	10	11	12	13	14	15	16	17	19
(h) Same as (3a) with composition siding over wood siding	0.21	8	11	13	14	15	16	17	18	19	21
(i) Same as (3a) substituting asphalt or asbestos shingles for wood siding	0.30	12	15	18	20	21	23	24	26	27	30

Fig. 2—A sample of the Tables listing the new Heat Loss Factors. These new Factors simplify heat loss calculations. A great many more constructions than formerly are listed in the new Manual.

HEAT LOSS FACTORS listed in Table 2 are:

$0.25 \times 40 = 10$ for a 40 deg. temperature difference
 $0.25 \times 80 = 20$ for an 80 deg. temperature difference
 $0.25 \times 100 = 25$ for a 100 deg. temperature difference
 and so on.

In using Table 2 in the Manual (shown in Fig. 2) the Btu. per hr. is determined by multiplying the area of the wall, in square feet, by the appropriate HEAT LOSS FACTOR. For example, for Chicago, if a given room has 100 sq. ft. of frame wall of the type just mentioned, the Btu. per hr. loss for the wall alone is 100×20 or 2000 Btu. per hr.

b. For Interior Partitions

Outside walls, windows and doors are equally simple. The question arises as to what to do for an interior partition where air at room temperature is on one side of the wall and air at some cooler room temperature is on the other side. For precise work, extreme labor would be involved in trying to decide what the temperature of an unheated room would be when the outdoor is, say, zero deg. or minus 20 deg. F. In practice, an estimate is made of this temperature. We have, in the Manual, made such an estimate once and for all, and assumed that such interior unheated spaces will be midway in temperature between indoor and outdoor temperature. For example, if the indoor design is 70 deg. and the outdoor design temperature is 0 deg. F., the temperature difference for the interior partition wall has been assumed as 35 deg. Furthermore, if the U value of this partition wall is 0.34, the heat loss factor listed under the 70 deg. diff. column is 0.34×35 or about 12. Note that in using the heat loss factors for an interior partition you stick to the design column for your locality. You do

not have to estimate or guess at the temperature on the other side of the partition. We've done the estimating for you. You do not have to jump to a column headed "35 deg. difference" just for this case. If the design temperature difference for your locality is, say, 70 deg., you can practically forget all the other columns in Table 2.

c. For Ceilings

Conservative practice in figuring losses through ceilings has been to specify a ceiling temperature of 75 deg. when the room was at 70 deg. This has been done in the Manual. For example, under the column of 100 deg. F. temperature difference, the actual ceiling factors were obtained by multiplying the U value by 100 plus 5. In the 100 deg. column for a flat roof having a U value of 0.49, the actual factor is $105 \times 0.49 = 51$.

One other laborious estimate has been removed from the chores of the user. In figuring the losses through a ceiling over which is a roof, it has been customary in more precise work to consider the ceiling, the attic space, and the roof as an integral unit. The U value for this unit as a whole is termed a "combined coefficient." (See book, "Winter Air Conditioning," pages 155 to 157.) These combined coefficients have been figured for the ceilings described in the Manual and they are sufficiently accurate for any residence construction.

In a recent discussion with the chief mechanical engineer of the FHA it develops that the ceiling losses as figured by the Manual are also applicable to insulated ceilings where attic vents must be left open during the winter to dissipate any water vapor leaking through the ceiling. For an uninsulated ceiling

we consider that attic vents should be kept closed just as much as basement doors are kept closed, and the factors given in the Manual have been based upon this method of operation.

d. For Floors Above an Unheated Space

The air temperature above the floor has been considered 5 deg. cooler than room design temperature.

If the space beneath the floor is exposed to outside temperatures, as in those cases where the floor is above a garage, an unheated porch, or an open space, the temperature below the floor has been assumed the same as outdoor design temperature.

If the space beneath the floor is an unheated but enclosed space, the temperature below the floor has been assumed as midway between indoor temperature and outdoor design temperature. Again, the user of the Table should stick to the design temperature difference for his locality and not jump around from one column to another.

e. For Floors on the Ground

When a concrete slab floor is laid on the ground, the ground below the slab serves to a certain extent as an insulating material. Complete technical data on the ground temperatures for such cases are not available, as the discussion in the 1944 ASHVE Guide points out. The available data indicates that heat losses from floor slabs are much smaller than previous estimates led us to believe. These data give a U value of only 0.1 Btu. per sq. ft. per hr. per deg. From partial checks of heat losses from basement floors and walls in the two research structures in Urbana, the conclusion is also reached that we have been too generous in previous heat loss estimates.

The temperatures actually used for the ground below the floor have been based on data submitted by Prof. L. G. Miller of Michigan State College and are shown in Table 1 above.

The heat loss factors for these cases of a floor on

Table 1

For Design Temp. Diff. of	Corresponding to outdoor Temp. of	Ground Temp. below frost line were
40 deg. F.	30 deg. F.	70 deg. F.
50	20	65
60	10	60
65	5	57.5
70	0	55
75	-5	52.5
80	-10	50
85	-15	47.5
90	-20	45
100	-30	40

the ground were based on the temperature values shown in the last column, and these factors were placed in Table 2 under the appropriate design temperature differences.

f. For Walls Below Grade

In the case of walls below grade, the average temperature was assumed as midway between the ground temperatures given in the preceding table and the outdoor air temperature. For example, for an outdoor temperature of -10 deg. (design temperature difference of 80 deg.), the average temperature of the ground was assumed as midway between -10 deg. and 50 deg., or 20 deg. F. The actual temperature difference that was used in determining the heat loss factor was, therefore, 70 - 20 or 50 deg. F. The heat loss factor was then obtained by multiplying this value of 50 by the appropriate U value for the basement wall and was listed under the column for 80 deg. design temperature difference. Intricate and complicated steps of this nature require time beyond the limits available to the practical designer. Hence, by using the Manual tables the designer can avoid a lot of tedious calculations and at the same time can be using values that are consistent with the best practices in the industry.

Table 2b

INFILTRATION FACTORS BY CRACKAGE METHOD
(Multiply Infiltration Factors in Tables 28 to 32 by "Running Feet of Crack")
See Tables 15b, 16b, and 17b in Appendix

DESCRIPTION	INFILTRATION FACTOR (Multiply values shown by running feet of crack)									
	Design Temperature Difference, deg. F.									
	40	50	60	65	70	75	80	85	90	100
WINDOWS										
No. 28—Double-Hung, Wood Sash Windows										
(a) Average fit, not weatherstripped	28	35	42	45	50	53	57	60	65	70
(b) Average fit, weatherstripped or equipped with storm windows	17	20	25	28	30	32	34	36	38	42
(c) Poor fit, not weatherstripped	80	100	120	130	140	150	160	170	180	200
(d) Poor fit, weatherstripped or equipped with storm windows	25	30	35	40	43	46	50	52	55	62
No. 29—Double-Hung, Metal Windows										
(a) Not weatherstripped	52	65	75	85	90	95	105	110	120	130
(b) Weatherstripped	25	30	35	37	40	43	45	50	55	60
No. 30—Rolled Section, Steel Sash Windows										
(a) Industrial pivoted	125	160	190	205	220	240	255	270	285	315
(b) Architectural pivoted	65	80	95	105	110	120	130	135	145	160
(c) Residential Casement	35	45	55	60	65	70	75	80	85	95
(d) Heavy casement section	25	35	40	45	48	50	55	60	65	70
No. 31—Hollow Metal Windows										
(a) Vertically pivoted window	105	130	155	170	185	195	210	220	235	260

Fig. 4—Sample of Tables listing Infiltration Factors. These Factors are based upon the accurate "crackage" method of determining amount of infiltration.



g. Infiltration Factors

The subject of infiltration and its determination is too lengthy for any condensed discussion of this nature. However, there are two common methods for determining the loss of heat due to the escape of warm heated air from a building. One method commonly used is that in which the volume of air for the building is determined, and some assumed value for the number of air leakages is selected out of thin air. This method, commonly known as the *volume method* of figuring infiltration losses, is none too good for any building that deviates much from normal. For example, the air volume method will give absurd results for churches, auditoriums, factories, warehouses, very tight residences, and residences having much glass exposure. In setting up the Manual we did not want to have a method that was so limited in application. Nor did we want to advocate the use of two methods, one for ordinary residence construction and one for the exceptions. Any choice of this nature merely leads to complications and the setting up of a lot of arbitrary rules to enable a designer to pick one or the other method.

The second method for determining infiltration losses has been accepted at the present time as the best method for all applications. This method is known as the *crackage method*. Like any method of figuring infiltration losses it has its limitations. Nevertheless, we felt that the crackage method could be simplified so that the process of figuring this loss was no more complicated than the process of figuring the transmission losses through walls and windows. In the Manual the infiltration heat loss is obtained by multiplying together just two numbers, as follows:

1. The length of the crackage around the windows and doors, in feet.
2. An Infiltration Factor that depends upon the tightness of the windows and doors.

The directions in the Manual cover the procedure for obtaining the crackage:

"Find the total length in feet of the crackage of the windows and outside doors for each room. Obtain the running feet of crackage around perimeter of window sash. Include crackage between sash for double-hung windows. Obtain the running feet of crackage around perimeter of outside doors.

"If room has *one wall exposure*, use total crackage on that one wall.

"If room has *two walls exposed*, use total crackage on wall having the most crackage.

"If room has *three or four walls exposed*, use total crackage on wall having most crackage, but do

not use less than one-half of total crackage for all walls."

For convenience in quickly determining crackages of common types of windows, three tables are given in the back part of the Manual that show the crackages for two types of double-hung windows and for casement windows. With a little practice and experience, the user of the Manual will be able to determine crackages as readily as he now obtains floor areas or wall areas.

The infiltration factors shown in the Manual were obtained from the following equation:

Infiltration Factor = (Cubic feet of air leakage per hour per foot of crack) (0.075) (0.24) (Design Temp. Diff.)

in which,

Cubic feet of air leakage per hour per foot of crack is obtained from the technical data given in the ASHVE Guide for 15 miles an hour wind velocity. The data show leakages for tight windows, weatherstripped windows, double-hung and casement windows, doors, etc.

0.075 is the density of air at 70 deg. F.

0.24 is the specific heat of air.

Design Temperature Difference is the difference in temperature between indoors and outdoors under design conditions.

For example, the Guide shows for a double-hung window, having average fit and not weatherstripped, a leakage of about 40 cubic feet per hour per foot of crack. If we assume a design temperature difference of 80 deg., the Infiltration Factor for this type of window becomes: Factor = 40 (0.075) (0.24) (80) = 57. This Factor of 57 is shown in the Manual under Table 2b, a portion of which is shown in this article.

Recommendations to the Industry

The Code Committee of the Association, as well as the Research Staff, recommend the following procedure:

1. Adopt the Manual in its entirety, including the heat loss method.
2. Adopt the method using Heat Loss Factors and Infiltration Factors.
3. Adopt the standard form of work sheets that have been printed.
4. Teach all beginners in the field by using textbook sections 1, 2, and 3, obtainable from the Association at a cost of 50 cents each.
5. Discard the obsolete term of "leader pipe ratings."
6. Use the Btu. heat loss method for both gravity and forced air application.

Motor Production Lags

DECEMBER fractional horsepower motor production figures were below November figures, the Fractional Horsepower Electric Motor Industry Advisory Committee have been advised by Government officials.

Committee members were advised of all of the essential war programs that will require motors either for inclusion in equipment produced or for facilities to produce, and were told delivery for these programs would be obtained by uprating of orders to AAA and by directions to manufacturers.

New orders from the military for aircraft motors and several other military types of motors during the last six months have been less than half of the total

number shipped. Manufacturers will find it impossible to maintain present production if new orders are not placed so that they can purchase materials, committee members said. There is not a sufficient backlog of orders in manufacturing plants to enable the manufacturer to place his orders for the necessary components and materials. This is apt to cause serious difficulty in the next few months.

The committee approved WPE's policy in authorizing production at approximately the rate for the fourth quarter of 1944 for future requirements. It is expected by WPB that users of motors will be held to approximately fourth quarter delivery of motors in the future also.

Essentials of Oil Burner Service

Part I

Commonest troubles — Bureau of Standards requirements — Test Apparatus needed — Test procedure which saves time — Service inspection and owner's certificate.

By E. F. Fuller—E. F. Fuller Engineering Co.—Oconomowoc, Wisc.

A FEW months ago American Artisan mailed to a representative list of readers a questionnaire asking each reader to list the four commonest troubles encountered on hurry-up oil burner service calls.

The following is a tabulation of the replies to this letter, calculated on a percentage basis.

Trouble

Trouble		%
Controls:		
Dirty ignition points.....	15	
Protecto relay	12	
Pitted thermostat points.....	4	
Other controls	3	Total—34
Fuel jet or nozzle plugged.....		25
Strainers or oil filters clogged.....		12
Motor Trouble:		
Failure to start.....	5	
Burned out motor.....	3	
Insufficient oil	1	
Cut out points.....	1	Total—10
Fuel pump		5
Pressure regulator		1
Out of fuel oil.....		7
Air in supply line.....		2
Poor adjustment		2
Broken refractory in combustion chamber.....		1
Sludge in fuel oil tank.....		1
		100

NOTE: Superflex Oil Burner Owners neglect to:

- 1—Clean plugged fuel oil line.
- 2—Clean dirty burner bowl, causing extra service calls.

While a detailed service manual of all burners would require volumes, there is much similarity in the various types of oil burners so it should be possible to arrange general recommendations according to the report above. Much of our trouble springs from a cause which has been well presented by George R. Lenert of Naperville, Illinois, who writes:

"Automatic heat is advertised in such a way that the impression of the general public is that the heating plant has the brains to make its own repairs and render trouble free operation for a lifetime. Yet the owner of an automatic heating plant will buy a new automobile, have it washed and waxed, oiled and greased, change the motor oil every 1000 miles, and

make necessary repairs when needed; but does not realize the heating machinery in his basement never sees a service man until a generous breakdown occurs several years after its installation. Advertising usually stresses good equipment and installation—A good addition would be: *Plus annual inspection and service by your dealer.*"

Oil Burner Tests

The U. S. Bureau of Standards, AUTOMATIC MECHANICAL-DRAFT OIL BURNERS DESIGNED FOR DOMESTIC INSTALLATIONS. COMMERCIAL STANDARDS CS75-42 (Second Edition).

Size.—The burner shall be of adequate size for the boiler or furnace and connected heating load as re-

corded on the oil burner certificate by the installer. *Certificate.*—Following installation of the burner cer-

tain test data shall be obtained and recorded by the installer on the oil burner certificate to be placed with each burner installation. The test shall cover the fol-

each burner installation. The test shall cover the following points: CO_2 in the flue gas by analysis, draft, stack temperature, firing rate and smoke. The oil

stack temperature, firing rate, and smoke. The oil burner certificate shall be printed (not mimeographed) in a minimum size of 8½x11 inches, with

graphed, in a minimum size of 5½ x 8½ inches, and all the printing on one side, and shall be posted and protected by transparent material.

Requirements.—The standard requirements as approved by the industry are as follows:

(1) CO_2 .—The CO_2 in the flue gas by analysis shall be not less than 8 per cent.

(2) *Draft*.—The draft shall be in accordance with specifications in the manufacturer's installation manual. An automatic draft regulator or its equivalent is required.

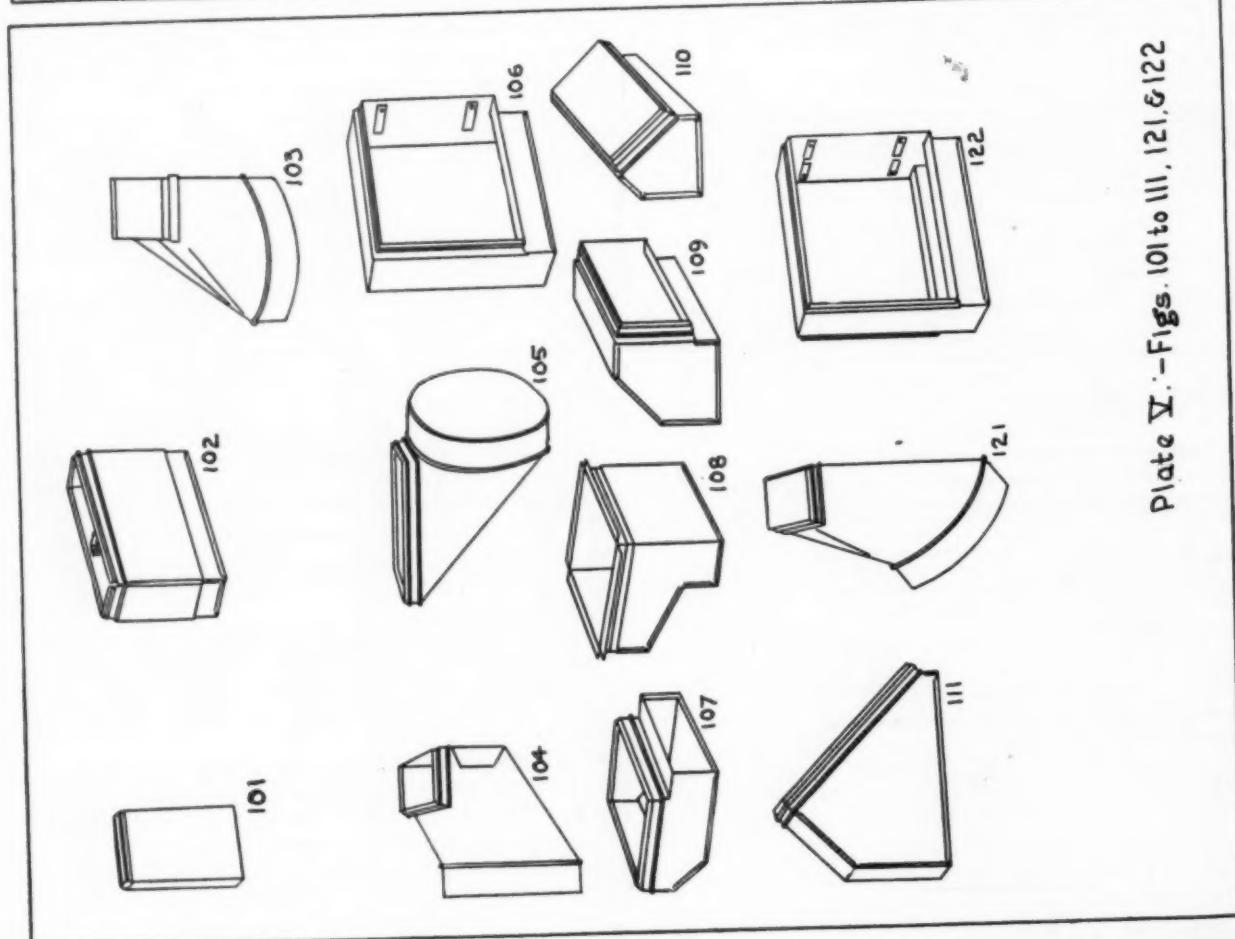
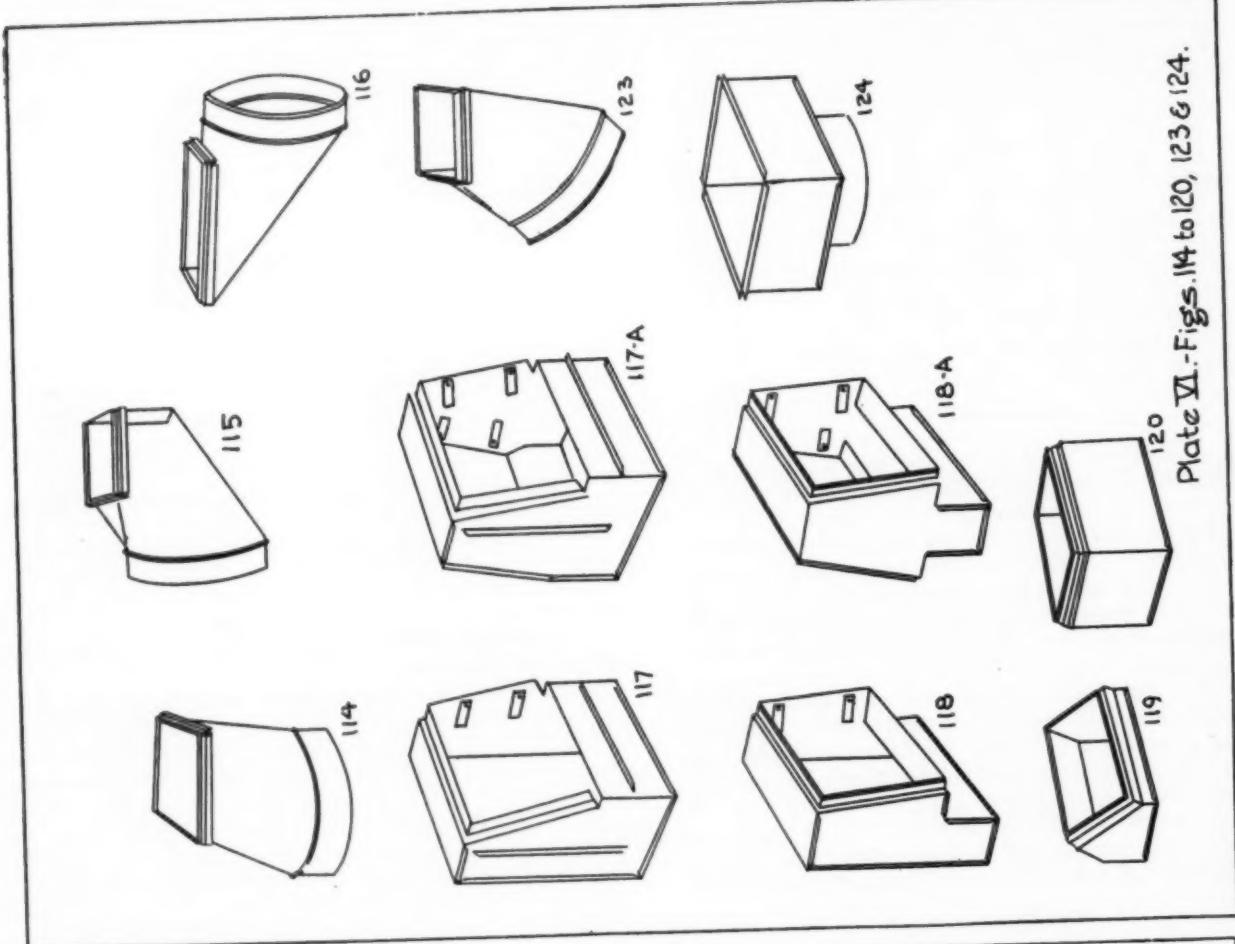
Note: By the author. Where no information is given by manufacturer of the heating equipment, the following may apply:

Draft Over Fire *Draft in Stack*
 02 Burner Heater Units (Average) 04

.02 Burner Heater Units (Average).....	.06
.04 Average Residence conversion units.....	.06
Average Industrial .....	.10

Some testers state they at times adjust to .00 draft over fire, however, too little draft may cause puff backs when the burner ignites, so a slight draft is

usually safer.
(3) *Stack Temperature*.—The stack temperature shall be measured on the boiler side of the automatic draft regulator and not more than 12 inches from the boiler



*Draft submitted by the Division of Simplified Practice, National Bureau of Standards, September, 1944.

Proposed Simplified Practice Recommendation For Pipes, Ducts and Fittings* [Part 2]

Table 6 Double Safety Construction Wall Pipe and Fittings, for Second Floor

Item	Fig. No.	Sizes, in inches	
Double safety wall pipe, in lengths of 1, 2, 4, 6, 9, 12, 24, and 30 inches.....	101		
Adjustable joint	102		
Boots (single construction with double safety connections and/or double safety construction throughout): ¹			
Universal	103		
45° angle	121		
90° angle	104		
Center-end	105		
Stackheads:			
Horizontal for one register above baseboard ²	106		
Horizontal for two registers above baseboard	122		
For floor register ³	107, 108		
Elbows, 90° shortway	109		
Angles, 45° shortway	110		
Angles, 45° longway	111		

¹Boots, sizes * x 10% have 8 in. collars, sizes * x 12% have 9 in. collars.

²Stackheads sizes * x 10% are for 8 x 10 registers, sizes * x 12% are for 8 x 12 registers.

³Stackheads sizes * x 10% are for 8 x 10 registers, sizes * x 12% are for 9 x 12 registers.

*Denotes depth of stack and fittings. The depth may be 3 in., 3 1/4 in. or 3 1/8 in., but it is recommended that no producer or distributor stock stack and stack fittings in more than one of these depths.

Table 7 Double Safety Construction Baseboard Fittings, for First and Second Floor, for One Register

Item	Fig. No.	Sizes (in inches)			
Boots to fit first floor baseboard boxes (single construction with double safety connections and/or double safety construction throughout):					
Universal	114				
45° angle	123				
90° angle	115				
Center-end	116	Register size 8 x 10	Base extension 2 1/4	Outside size of throat 6 1/4 x 10 5/8	Free area of throat (sq. in.) 55
Baseboard register box for first floor.....	117	8 x 12	2 1/4	6 1/4 x 12 5/8	9
45° angle	119	9 x 12	3 1/4	7 1/4 x 12 5/8	78
Extensions 2 in. and 4 in.....	120	11 x 13	5 1/4	9 1/4 x 13 5/8	110
Baseboard register box for second floor.....	118	Stack size * x 10% * x 12%	Register size 8 x 10 8 x 12	Base extension 2 1/4 2 1/4	

*Denotes depth of stack and fittings. The depth may be 3 in., 3 1/4 in. or 3 1/8 in., but it is recommended that no producer or distributor stock stack and stack fittings in more than one of these depths.

Table 8 Double Safety Construction Baseboard Fittings, for First and Second Floor, for Two Registers

Item	Fig. No.	Sizes (in inches)			
Boots to fit first floor baseboard boxes (single construction with double safety connections and/or double safety construction throughout):					
Universal	114				
45° angle	123				
90° angle	115				
Center-end	116	Register size 8 x 10	Base extension 2 1/4	Outside size of throat 8 1/4 x 10 5/8	Free area of throat (sq. in.) 80
Baseboard register box for first floor.....	117A	8 x 12	2 1/4	8 1/4 x 12 5/8	96
45° angle	119	9 x 12	3 1/4	10 1/4 x 12 5/8	120
Extensions 2 in. and 4 in.....	120	11 x 13	5 1/4	14 1/4 x 13 5/8	182
Baseboard register box for second floor.....	118A	Stack size * x 10% * x 12%	Register size 8 x 10 8 x 12	Base extension 2 1/4 2 1/4	

*Denotes depth of stack and fittings. The depth may be 3 in., 3 1/4 in. or 3 1/8 in., but it is recommended that no producer or distributor stock stack and stack fittings in more than one of these depths.

Table 9 Floor Register Boxes, Double Safety Construction

Item	Fig. No.	Sizes, in inches	
Floor register boxes	124	8 x 10 x 8 9 x 12 x 9 10 x 12 x 10 12 x 14 x 12 14 x 16 x 14	

Typical License Questions in Ft. Wayne

WHEN a city heating ordinance is proposed or adopted there usually is incorporated a "grandfather" clause which automatically gives to every heating man in business when the code goes into effect a license to operate under the ordinance. But when new firms or individuals signify a desire to engage in the heating business or when a "grandfather" has his license revoked for failure to comply, then an examination is given to determine if that individual or firm is qualified to do warm air heating installation.

A good many contractors seem to worry about the questions asked in such an examination. Some seem to fear that the questions are so tough they stump a college graduate. Some seem to have a suspicion that the questions are purposely intended to keep a man from engaging in business.

Quite the contrary is the case. We publish in paragraphs following typical examination questions used in the city of Fort Wayne, Indiana, and a floor plan on which the questions are based.

It will quickly be noted that the first group of questions are designed to get a heating history of the applicant—what type of heating work he has done; what is his education; who has he worked for and in what capacities; under what setup will the applicant engage in heating after getting the license; what shop facilities or tools does he possess or intend to get.

It will also be noted that in the questions for either a gravity license or a forced warm air license, many of the questions are answered in the code—the applicant is presumed to be completely familiar with the regulations in the ordinance and if he is so familiar

can easily answer these questions. The theoretical questions are very elementary—if the applicant can't answer these it is fair to believe he knows nothing about warm air heating.

Finally, the examination takes a typical house plan and asks the applicant to calculate heat losses, pipe sizes, register sizes, return air sizes and furnace and fan capacities required to heat the house in the plan. These questions, also, the applicant surely should be able to answer correctly if he knows his local code and if he knows the most fundamental requirements of engineering.

AMERICAN ARTISAN believes that mention should be made of one fact we have continually emphasized in most of our reports of codes or code problems—no code is one bit better than its inspection. If a code is desired, provision should be made for strict enforcement of all the regulations—that kind of enforcement means adequate, prompt and intelligent inspection. The inspector should know his business. If possible the inspector should be a graduate engineer or a practical warm air heating man who knows how an installation should be engineered and installed. The inspector should recognize that there are variations not covered in the code and that some ideas are just as sound as the regulations even if not mentioned in the code. That kind of an inspector is worth a real salary—it's not a job for some \$20 a week ex-truck driver or political "cousin." Finally, the inspector or the department should be supplied with sufficient funds and manpower to compel compliance. Without this kind of inspection and inspectors the code deteriorates.

General Examination to Determine Experience

Examination of Mr. Date.....

Address..... City..... State.....

When and where born: City..... State.... Year.....
Month..... Day.....

Have you read, and are you familiar with the provisions of the present Warm Air Heating & Sheet Metal Code, Ordinance No. 1906?

Are you willing to subscribe to, and abide by the provisions of Ordinance No. 1906, and confine your activities to the branches of same for which you have been granted license?

Have you attended any technical school or schools or what is the extent of your training to prepare you for the duties involved in the execution of work governed by Ordinance No. 1906, for which you seek license Did you graduate and receive diploma?

By whom were you employed and what were your duties during

1941 as

1942 as

1943 as

What is the extent of your personal experience in the branch of the industry for which you seek license, and

how long were you engaged in and performing the duties of Helper as Mechanic as Installer as Supervisor as Salesman as Engineer

By whom are you now employed?

What are your present duties?

What duties involved in the execution of work, governed by Ordinance No. 1906, do you intend to perform, personally, should you be granted the license you seek?

By whom will you be employed or by what firm name will you operate should this license be granted?

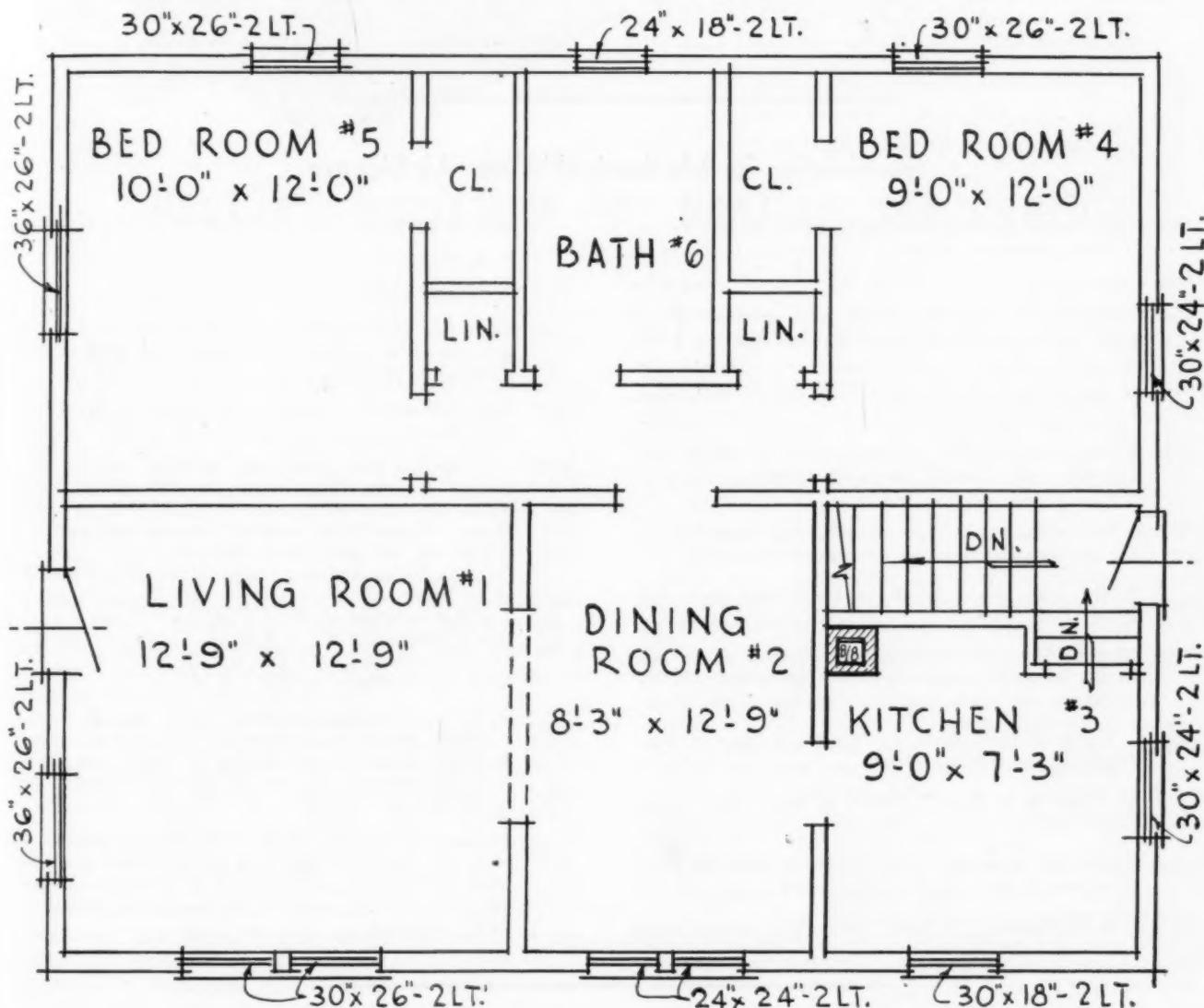
Address

Have you ever before applied for any license to operate under any branch or branches of Ordinance No. 1906? .. Give date Was such license granted? If refused, for what cause?

What tools and equipment do you now have, required to carry on the work for which you seek license?

What tools and equipment do you intend to add, should this license be granted?

BASEMENT UNDER ENTIRE BLDG.
CEILING HEIGHT 8'-6"
WALLS STD. FRAME CONSTRUCTION
WINDOWS DBL. HUNG WOOD SINGLE GL.
ASPHALT SHINGLE ROOF



Typical house plan used by applicants to figure heat loss and engineer an installation

Examination for Gravity License

Gravity Warm Air Heating Examinations of Mr.

Date

Q-1. What is the meaning of gravity warm air heating and of what does it consist?

Q-2. By what motive head does the gravity warm air heating system accomplish the desired effect?

Q-3. By what method is the load requirement of a heating system determined?

Q-4. Under Ordinance No. 1906, what is the first step taken in the installation of a gravity warm air heating system?
Second step? Third step?

Q-5. Using the floor plan attached hereto, determine and show:

The B.t.u. losses for each room at 70 inside and 0 outside.
The basement pipe area for each room. (Warm Air)
The register size required for each room.
The total cold air pipe area required and sizes in inches Diam.
The free areas of the C. A. faces, and sizes in inches.
What would be the minimum basement pipe area rated capacity of a furnace to heat this building?
What would be the grate area required to heat this building if the fuel value was 12,500 Btu. per lb.; the combustion rate 7.5 lb. per sq. ft. per hr.; the unit efficiency was 60%; the combustion and transportation losses were 30%; and a factor of .866 allowed for bad firing, accumulation of soot, ashes, etc.

Q-6. What would be the warm air pipe area requirements of a furnace if rooms were added as a second floor to this plan with losses of—one bedroom with losses of 8,200, one bedroom with losses of 7,600, one bedroom with losses of 6,500, one bath with losses of 2,600?

Q-7. What inside-outside temperature differential is recognized as correct for figuring heat losses in the territory in which Fort Wayne is located?

Q-8. What method should be used in connecting gravity warm air pipes to the hood or bonnet?

Q-9. What is required where the furnace top comes within 10-in. of wood floor joist?

Q-10. What is the requirement of the installer after a gravity warm air heating job has been completed?

Examination for Mechanical Warm Air License

Mechanical Warm Air Heating Examination of Mr.

Date

Q-1-A. Explain in your own words why automatic controls are required on all mechanical heating jobs.

B. Name five advantages to be had by their use.

Q-2. When does a gravity system cease to bear such distinction and classify as a mechanical system?

Q-3-A. Why was the old type propeller fan discarded for the present day type fan or blower?

B. By what term is the present day type fan known?

Q-4. Give at least (5) separate advantages to be had in the mechanical system over that of the gravity system.

Q-5-A. Name at least three (3) separate types of heat found in any heating system.

B. What is a B.t.u.? Define in your own words.

Q-6. Name two separate systems used in heating most essential to the success of the system.

Q-7-A. Is it necessary to baffle the gravity system when same is converted into a mechanical system?

B. If so, why?

C. If not, why?

Q-8. Name five (5) practical points to be observed in the designs of a mechanical system essential to the elimination of noise.

Q-9. Name five (5) factors affecting temperature gradient.

Q-10-A. Using the plan submitted herewith and the following specifications, show the following items: B.t.u., free area of register or grill, area of stack, area of leader pipe, area of main duct, and the C.F.M., all for each room separately. Using a design register temperature of 150 deg. F. at 10 below Register velocity of 350 C.F.M. Stack velocity of 500 C.F.M. Leader velocity of 575 C.F.M. Main Duct velocity of 650 C.F.M.

B. Cold air returns at design of 65 deg. F. at the register. Would you return a like amount of air from all rooms to the furnace or would you divide it in proportion? Answer in your own words and in detail.

C. How many gallons of oil would be required to heat this building to 70 deg. if the mean temperature was 40 deg., oil value of 140,000 Btu., and an efficiency of 75%, and 241 heating days, during the firing season?

Engineers Compensation Rate

American Artisan:

For some time I have been fighting with the Industrial Commission of Ohio on the compensation rates which they have been charging us. We, along with other dealers, have been charged the same rate by the Industrial Commission for a salesman, draftsman, or engineer as we would pay for a mechanic on the job. The argument the State uses is that many salesmen have been injured on the job and the state has been required to pay in a number of cases.

My argument has been that these have been the smaller shops, as larger shops that maintain an engineer and sales department do not have these risks as they are not on the job. It is reasonable to believe that a draftsman or engineer who spends all of his time drawing plans and making a presentation and survey on the job should not pay the same rate as the

mechanic. The rate is around \$1.20 for the mechanic and 17c for the salesman and engineer.

Recently the Commission went back to 1939 charging us this higher rate. In other words, we are obliged to pay right now several hundred dollars for this additional rate when we knew nothing about their intentions until just recently. It does not seem fair to ask us to pay this high rate for five years when we had no chance of adding it to our cost.

Matters of this kind are things that could be discussed at a dealers' meeting in conjunction with a dealers' conversation as they are of real importance to every dealer.

Yours very truly,
SCHMIDLIN BROS. HEATING CO.,
Toledo, Ohio.



Post-War Heating

Ideas, Equipment, Installations
which may find acceptance in
new houses and modernization

"Double" Registers for Heating and Cooling

By B. L. Schwartz
Pittsburgh, Pa.

MOST of us are dreamers, even in our daily work routine. We are sure that there must be a better way of doing the things the job calls for, and some day, by golly, we are going to show the world how it should be done. So it goes with heating men as well as shoemakers, architects, street car conductors, etc.

The heating industry has come far in the past twenty-five years. We have seen the advent of forced air heating from the experimental to the fully accepted stages. The pressure blower, the gas conversion burner, stokers, oil burners, etc., have, in turn, resulted in improvements in operating characteristics, so that today the average heating plant is more or less automatic and fairly efficient.

On the other hand, there are still some undesirable features in even the best of these accepted systems. Under normal conditions, the correction of these defects eventually will be made, but if we are to judge by the conservatism with which other suggested improvements have been met, such corrections are apt to be a long time in coming.

Planning for a postwar heating and air conditioning system gives us an excellent opportunity to incorporate into the system those improvements which many of us know should be made. Actually, it is doubtful if there will be any radically different controls or basic methods of heating or air conditioning brought out as the actual result of this war experience in the manufacturing or engineering end. However, we do have a wonderful opportunity to improve our designs and add those controls which we know will make for smoother, better and more economical results. Insofar as the public is concerned, the net results will be so much better that we need not hesitate to take full credit for a new and outstandingly improved postwar development. While the basic principles on which this new system will depend remain fundamentally the same, certain developments not previously known or used will be included to bring about the results we seek to establish.

Developments to Date

The most commonly accepted heating system for residential and small commercial buildings today consists of a forced air or winter air conditioning system incorporating a heating unit (either gas, oil or coal fired), blower, filters, automatic humidifier and the necessary controls for the operation of these elements. These controls usually include a thermostat, automatic

blower switch, safety pilot and limit control. A system of supply ducts from the heating unit to the various registers is used to carry the heated air to the rooms as needed. Another series of ducts from the return faces in these rooms makes a closed recirculating system.

The operating cycle is an "on or off" control method, and this constitutes one of the weakest links in this method of heating. The most frequent complaint has been (and still is) "The system is fine when the blower is on, but as soon as it goes off, we start to get cold." We cannot pass this off by saying that the registers were incorrectly laid out; that there are insufficient returns, that the thermostat is in the wrong location, nor any other excuse. Granting that much damage can be and has been done because of these errors in design, the fact remains that our present day system has certain inherent defects even if the layout is basically right. These defects are primarily with the heating unit and the controls thereof.

Units are sized to meet the worst conditions to be anticipated. That makes them *oversized* for all conditions other than the very worst, and worse conditions occur only a very few times during any one heating season. Furthermore, most units operate on the principle of "full on" or "full off." Thus, when the thermostat calls for heat, the unit comes on full force even if the need for operation is very slight.

The preceding analysis applies primarily to the heating cycle. Where a cooling feature is included with the system, these objections do not apply. A difference of one or two degrees above or below the customary room temperature when heating is required becomes quite noticeable, but there may be a variance of several degrees in hot weather before the average person is aware of any change.

The Ideal System

In proposing the ideal system for the postwar period, those features should be included which can be accomplished with known equipment and controls, together with certain other equipment which will or can be made available at that time. To this end then we shall include some apparatus not yet on the open market nor perhaps even developed. These items are apparently relatively simple by comparison with the wonderful things our engineering experts have brought out during this war period.

A year 'round real air conditioning system includes

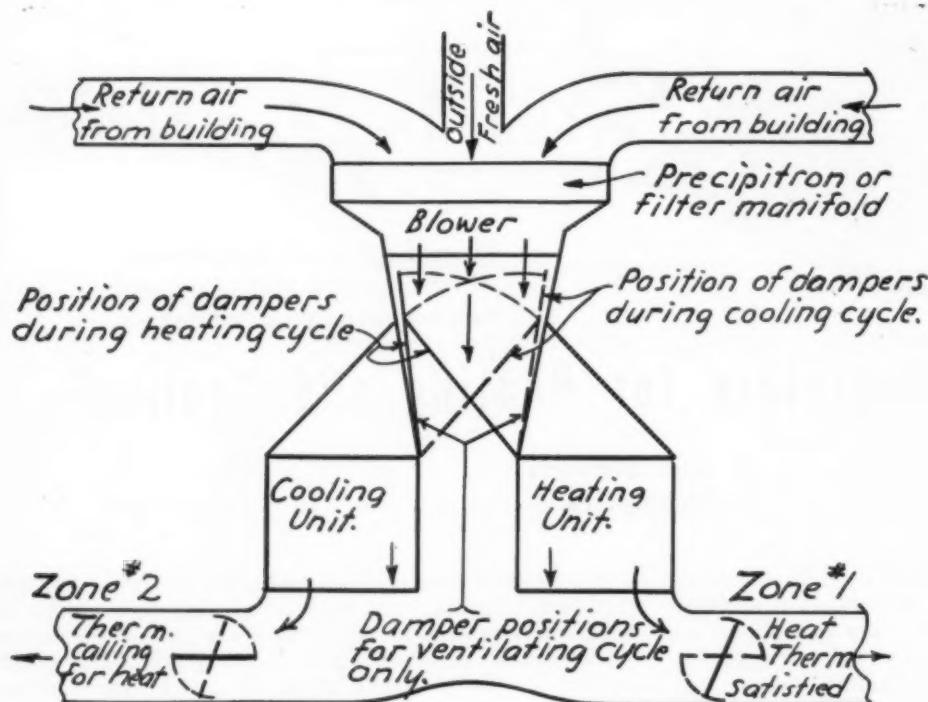


Fig. 1

Return air plenum above blower includes fresh air intake and is equipped with two dampers which can be manually set at change of season or automatically set from temperature. This system can be installed piecemeal. Several variations of construction are readily apparent.

two main functions. These are (a) heating and (b) cooling, in the order of their importance. Most of the other functions are coherent with these two main features. Some of these include air circulation, air filtration, fresh air supply, etc. Furthermore, a single system of ducts and grilles can be used for the distribution of the conditioned air, whether it be heated or cooled, or neither.

The heater of the system will probably consist of a gas, coal or oil-fired heating unit. Since gas is now available in practically all cities and towns, and many surveys show gas high up in home builders' preference list, this "ideal" plant will be built around gas as the fuel supply. Some of the reasons for the popularity of gas are: better control, minimum space required, available service in case of need (gas companies have service men on duty at all times). The cost of gas for heating is usually not too high for those who want it and is frequently less than the cost of oil for the same purpose. With the newer methods of transporting gas hundreds and thousands of miles via high pressure systems, this fuel supply should never run out. Its availability will become greater in future for those communities where this fuel (gas) is not at present permissible for heating purposes. The elimination of any storage capacities by the user as compared with coal or oil storage requirements on the individual premises to be heated, is only one of the many advantages of gas as the fuel supply.

Where gas is not available for heating or its use becomes subordinated to coal or oil as the fuel to be used, the same general principals of design will still apply insofar as the air conditioning plant is concerned. In such event, the controls will differ somewhat, but such difference will affect only the heating unit as such.

A cooling unit shall be coordinated with the heating unit in the general assembly of the air conditioning equipment. Most of our present day commercial units are capable of doing an excellent job of cooling. With the economies which the postwar developments are sure to bring, plus simplification and improved con-

trols for operation of these units, the cost should be brought down so that such equipment can be incorporated as a part of all air conditioning systems.

The two main divisions of heating and cooling, each requiring different and separate equipment, lends itself nicely to a combined or a split system. This reference applies to the basic conditioning equipment only. The distribution system should be designed as if both units were to be installed from the beginning, even if the cooling unit is to be added at a later time. While such combinations are not new, their use has been limited. The ability to give each home a plant that will enable the occupants to have uniform indoor conditions at all times certainly fires one's imagination.

Details of Design (See Fig. 1)

The return "manifold" shall include adequate filter equipment or a "Precipitron." This last is a very fine addition to any system of air conditioning. Electric precipitators have been on the market for a number of years. While rather bulky and somewhat expensive, the new postwar models of such apparatus will undoubtedly be much more compact. And with increased production due to greater demand, the cost will probably be considerably reduced. An automatic timing device should be included for cleaning purposes.

A system of supply and return ducts shall be installed in accordance with standard methods of sizing for maximum cooling load to cover the entire building. Larger ducts are required for cooling than those needed for heating; hence this determines the size of the piping. Ducts shall be rectangular in shape. While not as efficient as round ducts for the same quantities of materials used, rectangular ducts do present a neater appearance, and they can more easily be worked into the building construction. These ducts should be concealed wherever possible.

The blower size is likewise determined by the cooling requirements. Here again the quantities of air to



be moved during the cooling cycle are greater than those needed for the heating cycle. The blower shall be continuous in operation, but its speed will vary, depending on the bonnet temperature of the heating unit. This may be a three speed blower or one with continuously variable speeds, provided a dependable motor drive and control to meet this specification can be made available.

Supply registers in the rooms shall be a combination of low and high wall grilles. The lower grilles will be used for heating, whereas the upper grilles will be used for cooling and ventilating purposes. Thus, each wall duct will have two outlets, one in the base and the other in the same vertical line with it but about one foot below the ceiling. All ducts shall be concealed in the walls.

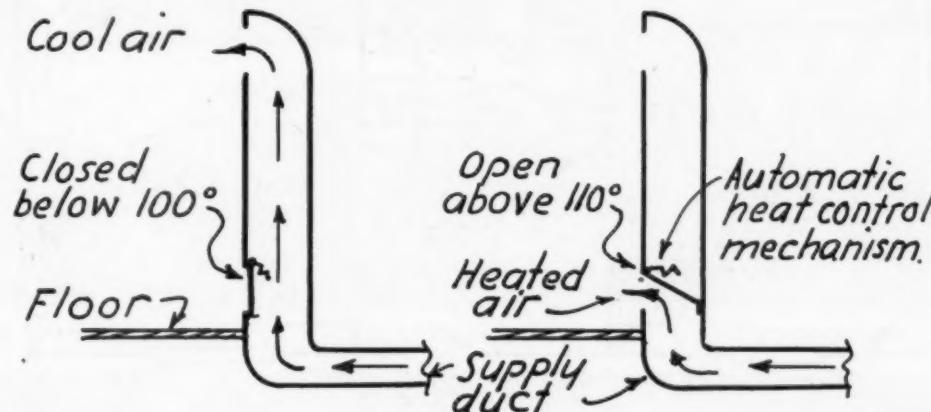
Automatic Register Control

A heat control to automatically open or close the register box damper (Fig. 2) of each floor level register shall be incorporated in the installation. In operation, this will function as follows:

With the blower on at all times, there will be certain periods when no heat is required. At such times the air temperature will be below 100 degrees, and the register box damper will be closed. The air will then be discharged from the upper registers, which have no louvres. As the thermostat calls for heat, the air temperature begins to rise, and when it reaches 110 degrees the damper is automatically opened (and closes the stack) by the built-in heat control. The heated air then flows out from the lower or floor level register face. This same action results in shutting off the air flow from the upper outlet face. When the thermostat is satisfied, the air temperature drops, and the dampers automatically drop with it. This cycle may be repeated indefinitely and results in a constant flow of air at all times.

Fig. 2

For continuous blower operation, this arrangement of high registers for cool air and low registers for warm air eliminates effects of drafts. High registers also ready for cooling. This arrangement is also suited to two- or three-speed blowers.



The purpose of having the cooler air move from the upper registers only is to prevent drafts or noticeable air motion of cool air at the floor level. Experience has proved that air in motion at temperatures below 110 degrees F. causes a feeling of drafts which in many cases is very objectionable. By having this cooler air in motion at levels above one's head, such effects are avoided, and we still have the desirable results of continuous air motion for cooling and ventilation purposes.

Fresh Air Requirements

A fresh air intake shall be included in the inlet side of the duct system. This shall have a minimum capacity in accordance with the ventilation standards for the community. It may vary from five to thirty cubic feet of fresh air per person per minute, and should be based on the *average* number of occupants. The number of air changes in the house should be not less than four per hour as a minimum, and may go as many as ten changes per hour for cooling and ventilation. Greater air motion than this may involve an undesirable condition of too much air motion.

Return faces shall be at the floor level. All faces—supply as well as return—shall be base or wall type. They should be of the directional flow type, with adjustable bars for individual application. Head dampers shall be built into each supply and return head in order to permit final adjustment of air velocities as needed.

A relief outlet to the attic (if ventilated) shall be provided from a central location in the building. This is to prevent the building from becoming air bound. A second floor high wall or ceiling register to cover this relief outlet makes a simple installation of this feature.

Register and Thermostat Location

(Fig. 3, Page 74)

Having determined the heater, cooler, blower and duct sizes, we must now locate the registers and return faces. A simplified plan, typical of the principal involved, will illustrate the few points which should be followed for best results.

Supply ducts and registers shall be on *outside* walls, with returns on *inside* walls. This arrangement will reduce or eliminate any objectionable air motion across the rooms by causing the flow to be away from the outside walls, rather than across the entire rooms if the plan was reversed. Furthermore, by discharging heated air as near to glass surfaces as is practical, the phenomenon of objectionable condensation is practically eliminated.

For a simple residential or store building one thermostat for dual control (heating and cooling) will usually suffice. Its location should be carefully picked for best results. This is of extreme importance. A poor location of the thermostatic control will cause more harm than most other errors of design. A few cautions should be observed to prevent such an error:

(1) The thermostat should not be placed where the sun may shine on it through a window.

(2) It should not be in close proximity to a register or where the heated air may be directed against the thermostat.

(3) The living room is not a good spot for the thermostat if there is a fireplace which will be used.

(4) Similarly, the thermostat should not be installed on an inside wall next to a kitchen.

A good location for the thermostat is in the dining room, on an inside wall, but within a foot or two of an outside wall. It should be installed about four feet from the floor line, or lower if practical.

The Heater

The heating unit shall be of the throttling flame type. This means a varying heat input as determined by the thermostat. A falling room temperature increases the gas input and with it the heat output. As the room temperature rises the gas input is throttled. Thus we have some heat delivery to the building at all times up to the point where the room thermostat is satisfied.

Since the blower speed is correlated to the heat output, the air velocities will vary with the air temperatures. Thus a low register temperature will result in a slow air motion, just enough to offset a mild heat requirement. As the need for more heat input develops, the blower speeds up with that requirement. There is, however, a minimum blower speed due to the fact that the blower is in constant operation. Thus the system assures adequate ventilation even if no heat is required.

The Cooling Cycle

When the room temperature rises to the point at which cooling is called for, the refrigerating unit

comes into action. This same contact increases the blower speed to its maximum. The cooled, conditioned air is then discharged from the upper supply grilles as previously outlined. The dual thermostat is so constructed that only one element (heating or cooling) can call for operation at any one time. If neither action is required, the blower coasts along at its minimum speed for purposes of ventilation and air circulation. None of these operating cycles interfere with any of the others, and the transition from one to the other is 100 per cent automatic.

Humidification and Dehumidification

The heating unit embodies in its construction an automatic humidifier. This may be controlled by a humidistat for close limits of room relative humidity. Such control is a necessary and very desirable part of every real air conditioning system.

The reverse process becomes desirable during the cooling cycle. Most refrigerating units do a certain amount of dehumidification in the very process of cooling. The amount so rendered cannot be controlled since it is incidental to the cooling operation. Furthermore, such dehumidification is ordinarily insufficient to lower the relative humidity to the point where it should be for best results.

A satisfactory atmospheric condition can be obtained by any combination of temperature and relative humidity that falls within the comfort zone. Thus a bigger drop in the relative humidity in combination with a comparatively small temperature differential will result in the same feeling of comfort as will a small drop in relative humidity if the temperature drop is greater. Thus one needs merely to set the cooling thermostat to the point where sufficient comfort is obtained.

Zone Control

Where the building to be air conditioned lends itself to zoning advantages, two or more dual thermostats should be used. In such event, each zone will be controlled by an automatic damper, which, in turn, is operated by the action of its own corresponding ther-

(Continued on Page 108)

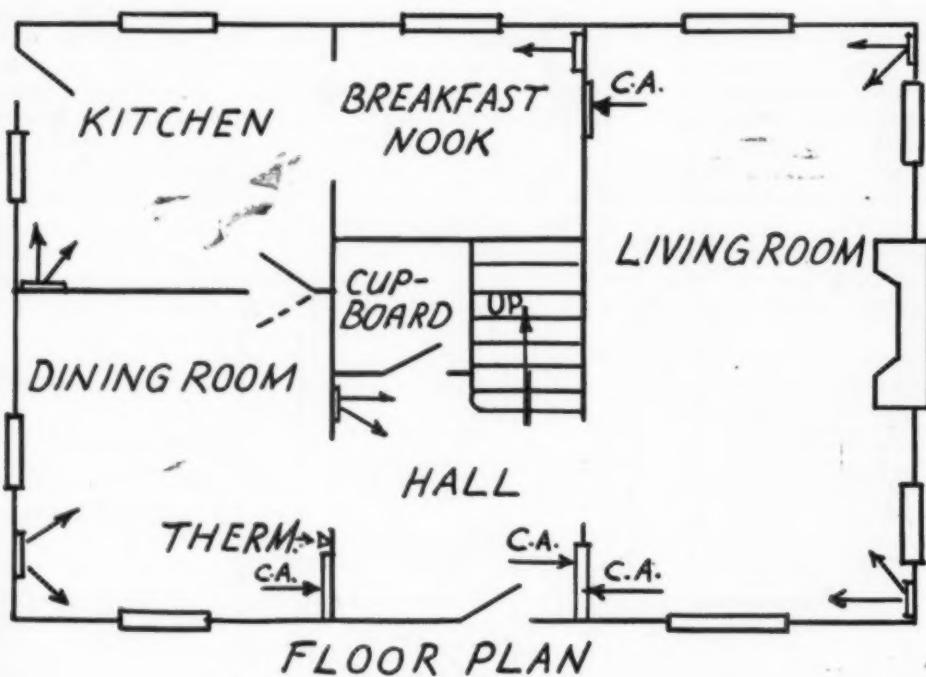


Fig. 3

Note this plan shows supplies on outside walls and returns on inside walls to shorten return air travel. Two-way louvres direct warm air toward cold glass and walls. One thermostat is satisfactory for small houses — larger spaces should be zoned.

AMERICAN ARTISAN

SHEET METAL

SECTION



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING



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AMERICAN ARTISAN, February, 1955

Found — A Construction (Stiffeners) Which Prevents Box Gutter Failure

COPPER has been so successfully used as a structural material and its qualifications found so generally satisfying that when a few 16-oz. copper roofing and gutter installations failed on a monumental building or two some years ago, the scattered failures were attributed to the always-handy bogeymen of the industry, "expansion" and "contraction," or to the other easy answer to any copper problem—shoddy installation work.

The problem posed was recognized as a serious one, particularly in terms of postwar specifications for large-scale building programs, by Revere Copper and Brass Incorporated, who accepted the responsibility for its solution.

With this in mind, Revere's research department, working in conjunction with the Division of Architecture of the New York State Department of Public Works, set up a laboratory in Rome, N. Y., to test replicas of installations that had failed. The tests were conducted with box gutters, the most difficult installation to apply.

A partial report of the experiments, begun in May, 1941, discloses that while some of the faulty installations were due to bad workmanship, most of them could be attributed to the use of the incorrect gauge and temper of the copper to do the job.

Normal Construction Lacks Strength

It was first discovered that the 16 oz. soft-rolled copper generally specified lacked the column strength to move sections of a monumental building gutter to and from the expansion joints without buckling. Then it was determined that a heavier gauge of metal stood up indefinitely.

The experiments were conducted by Ivar E. Anderson, a Revere research engineer. They consisted of submitting duplicates of the faulty guttering to suc-

cessive hot and cold cycles with a temperature range of between 150 and 160 degrees, matching the temperature range found in the State of New York. He at first conceived the idea of heating with steam and then electrical heating units, but discarded both of these in favor of 250-watt heating lamps. Superimposing ten of these lamps on a model gutter three feet long, he tried to bring the copper up to a high temperature by employing the principle of radiation.

"Bright" Copper Reflects Heat

Although plenty of heat was generated, the model installation did not begin to absorb enough of it to make the marked temperature change needed. This produced a problem which was not solved until Mr. Anderson reasoned that the bright metal was reflecting the heat waves instead of absorbing them.

He "darkened" the gutter by washing it in a sodium hydroxide solution. The heat "took" and the temperature of the model was brought to 400 degrees Fahrenheit, almost twice as high as was needed. The complete cycle was obtained by chilling the gutter with a sprinkling system.

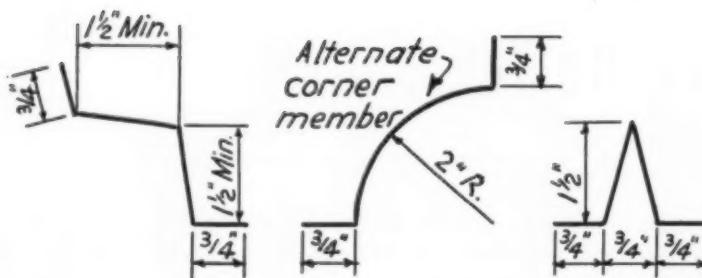
With this procedure perfected, the heating lamps were installed in such a way that 374 of them could project their waves at one time on a 65-foot gutter section.

By the spring of 1941 Mr. Anderson was ready to test the first of the 16 oz. soft-rolled copper gutters built according to established specifications with a heat cycle that in six minutes would duplicate a year's exposure to the weather.

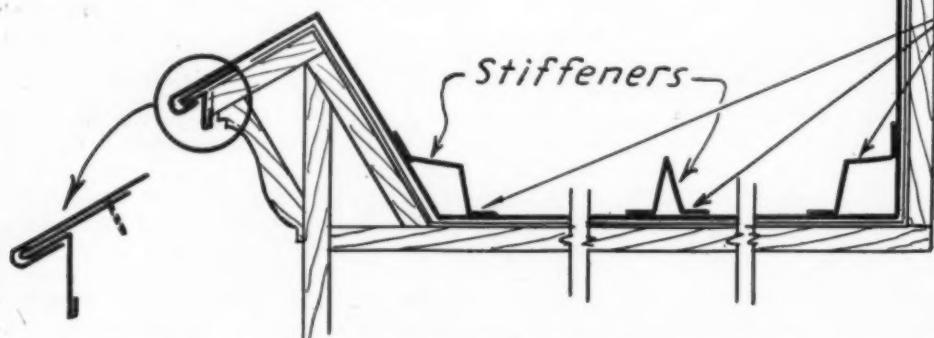
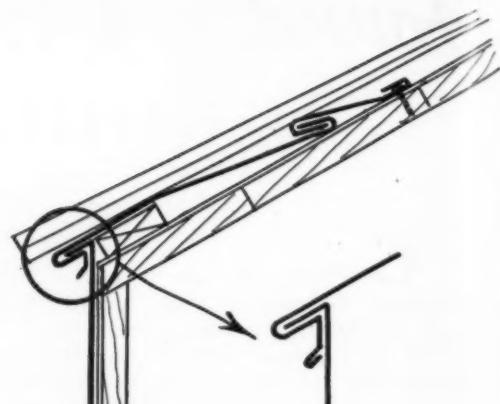
The first gutter tested consisted of two 32-foot sections separated by a 1-foot expansion point, its 8-foot sheets joined by soldered seams. This started to buckle during the first cycle and fractured beyond repair by the fifteenth.



Revere Copper and Brass Incorporated laboratory where full length gutter sections were heated by 250-watt heating lamps and cooled by water spray so that a full year's expansion and contraction could be cycled in six minutes.



Detail of Stiffeners
24oz. cold rolled copper



All stiffeners
to be soldered
continuously
onto gutter.

"Stiffeners" of 16-oz. copper may be placed along the center line of the bottom or on the inside or the outside bottom edges and should be continuously soldered. One "stiffener," of the dimensions shown, gives necessary "columnar" strength to move a complete section between expansion joints, thus preventing cracking.

Three more of these gutters were tested with the same disappointing results, and then, as Mr. Anderson was lifting the last one off its supporting wooden frame, he noticed that the asphalt in the tar paper between the bottom of the gutter and the wood had started to bleed, causing the paper to stick and increasing frictional resistance.

Paper Lubrication Helps

He substituted a rosin sized building paper, added some flake graphite to the wooden frame, and ran the gutters through another heat cycle. Although 16 oz. soft-rolled was used, the copper didn't start to buckle until the tenth cycle and didn't fracture until the twentieth.

The reduction in frictional resistance extended the life of the gutter, but failures still occurred and continued to do so until Mr. Anderson installed stiffening members. This marked the initial step in the recognition of the function of columnar action.

The buckles in the last gutter that had failed were malletted down, the seams were repaired, and a stiffening member of 16 oz. cold-rolled strip was applied.

This reinforced gutter didn't buckle on the first cycle, the second, the fifth, or the fiftieth. In fact, it stood up under 500 cycles, at which time Mr. Anderson and his assistants moved to apply the principles developed to more orthodox methods of construction.

The next tests were conducted on replicas of actual gutters that had failed on New York State buildings, for Mr. Anderson suspected that adequate column strength had not been provided in these faulty installations.

A duplicate of a 32-foot section of a radius-type gutter on the State Veterinary College at Ithaca,

N. Y., that had failed badly was reconstructed. It was 16 oz. soft-rolled and, as was expected, it buckled sharply after six cycles. By the twentieth cycle it had fractured. Stiffening members were then applied and the reinforced replica withstood 500 heat cycles.

Following this test the actual 80-foot gutter in place on the college building was reinforced to add columnar strength and has been under observation as a field test. No indication of difficulty has been observed in this gutter during the two years that have elapsed since its construction was modified.

"Nailed Down" Needs Heavy Metal

The principle of column strength confirmed to this degree, Mr. Anderson undertook to solve an installation riddle that had been puzzling copper men for some time, the success of the huge box gutter on the State Capitol Building at Albany which, with no allowance for expansion and contraction, had not so much as wrinkled in the 70 years of its existence.

He built a 32-foot wooden frame, fixed on it with wood screws two sections of 16 oz. soft-rolled copper sheets, 30 inches wide, joined by riveted lap seams. This started to fail in two cycles and did crack at the end of eight.

However, Mr. Anderson knew that the Capitol gutter was constructed of 34 oz. cold-rolled copper, so he substituted 32 oz. cold-rolled metal, which at the end of 500 cycles was still as good as when first installed. The heavier weight metal, though fixed, had absorbed the expansion factor by bowing out without buckling.

The use of a heavier metal for monumental construction was plainly indicated as a result of these tests. They confirmed a survey of faulty gutters on ten State buildings which showed that six had failed because of inadequate column strength.

Letter Further Clarifies Construction

January 18, 1945.

Mr. J. D. Wilder, Editor
AMERICAN ARTISAN
6 N. Michigan Avenue
Chicago, Ill.

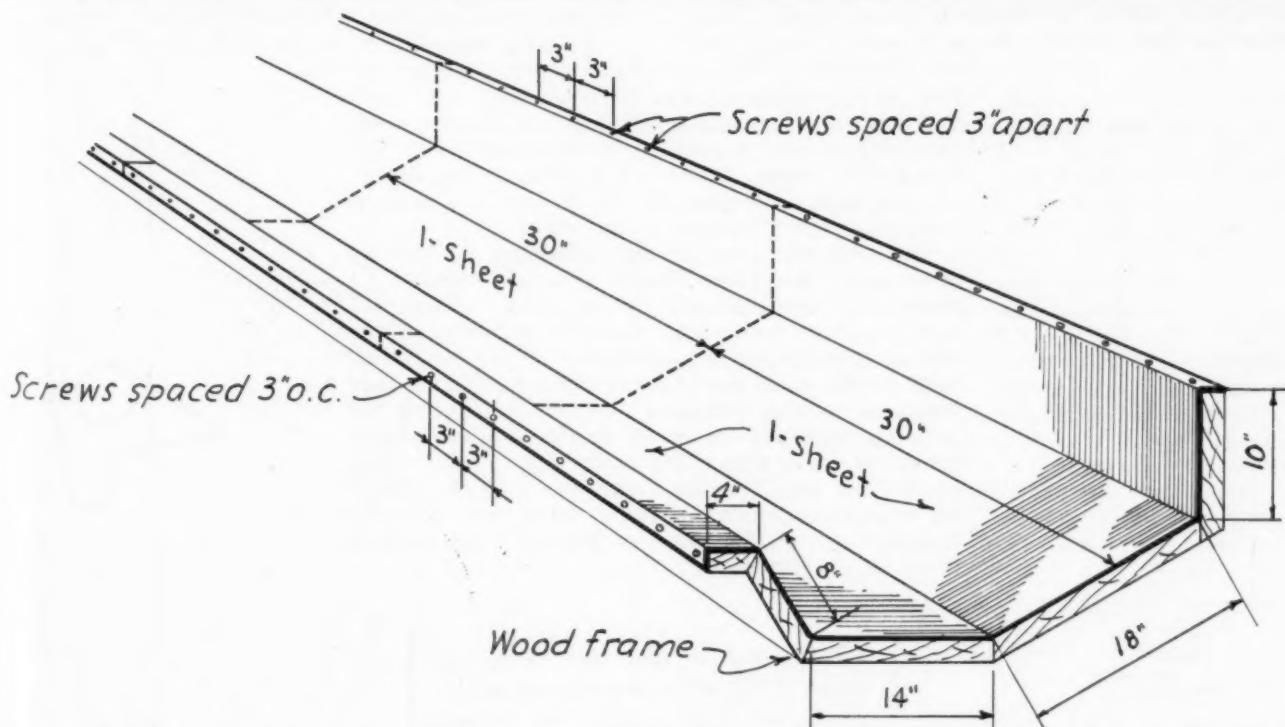
Dear Mr. Wilder:

In reply to your letter of January 12th regarding box gutter construction, I have listed the questions and answers. They are as follows:

1. Q. Are the three stiffeners recommended as shown in the sketches *continuously* soldered to the gutter or are the stiffeners tacked, or what?
A. The three stiffeners recommended are *continuously* soldered to the gutter.
2. Q. If one or two or three of the stiffeners shown are used, can the usual expansion joint be discarded?
A. No. The purpose of stiffener members is to transfer movement to the expansion joint without buckling the sheet.
3. Q. Or, if an expansion joint is recommended but stiffeners are used, how far apart should the expansion joints be placed?
A. Stiffener members are recommended for repairing faulty installations where buckles developed because of insufficient columnar strength of the gutter lining unit. If expansion joints were not provided in the original installation, they should be installed and placed not over 35 feet apart.
4. Q. If expansion joints are used, do the stiffeners continue right up to the joint or do the stiffeners stop short of the expansion joint, and if so, how short?
A. The stiffeners continue right up to the expansion joint.
5. Q. The last paragraph on page three of the manuscript says, "and a stiffening member of 16-oz. cold rolled strip was added." This evidently means one stiffening member and in this case is it the center, or the inside, or the outside stiffeners, or can it be any one of the three?
A. In this case it was in the center; however, since this, the first attempt of adding reinforcing stiffening members, we have found that stiffener members added at the inside corners provide the columnar strength needed.
6. Q. I don't quite understand the description of the construction which is described as sheets fixed on the backing and screwed down. This reference is in paragraphs 6 and 7 on page 4 of the manuscript. Can you furnish a diagram of this construction, or assuming we are discussing a complete gutter, just where is the screwing down done and where is the stiffener placed?
A. The attached diagram should answer your question concerning where the screwing down is done. There is no stiffener, of course.

If any additional information is needed, please let me know. I am looking forward to seeing this piece in the February issue of AMERICAN ARTISAN.

Sincerely yours,
IVAR E. ANDERSON, Research Engineer
Revere Copper and Brass Incorporated.



A gutter of 34-oz. copper is nailed down as shown here and shows no wrinkle after 70 years' exposure. If 32-oz. or heavier copper is used, this construction is breakproof—but lighter gauges will not stand up. The heavy gauge provides "columnar" strength.

Getting the Most Out of Your Press Brake

1001 Standard and Special Bending,
Forming, Flanging, Punching Operations
Your Press Brake Can Perform

By Ernest E. Zideck
Sheet Metal Consulting Engineer

Introduction to Press Brake Work

SHEET metal manufacturing is principally *forming* work. The shearing of the sheets of metal into strips and blanks and parts that precedes the formative work, although important in itself, is accomplished in a fraction of the time that it takes to form the metal into its specified shapes. The notching, splitting, punching and similar provisioning work that is done prior to the metal being forced into shape again may be accomplished in a lesser time than does the processing of the parts through the formative stages.

On the *accurate* forming of the metal into its specified shapes depends the fit of the parts in their assembly for binding and completion. Inaccurately formed parts, each varying by a fraction of a fraction of an inch in the several bends or upturns or flanges, causes much time-loss in the fitting of them together, and mars the appearance of the fit to such a degree that

the product may be unacceptable especially when the item is constantly exposed to the human eye. Such badly fitting assemblies might pass on jobs concealed, such as duct work bricked-in or otherwise hidden, but a bad fit between sections of a piece of "furniture" or equipment is quickly discernible and is a mark of incompetency on the part of the maker.

The beginner then in the operation of forming machinery—the Press Brake especially—should be thoroughly impressed with the importance of *accuracy* in the work he does, and it should be explained to him why a mere 1/32-inch discrepancy in the bends and turns in the sheet metal parts which he handles may result in junking the part. The men operating the forming machines and tools should be given opportunity to watch the men at work *fitting* the formed parts; then they'll better understand why they themselves must turn out formatures unvarying from the specification, or one piece so formed from another piece, or its counterpart.

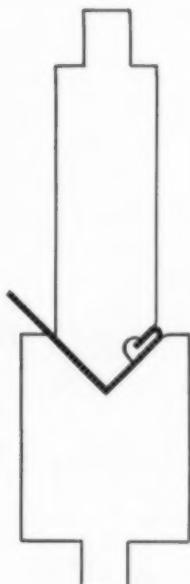


Fig. 1

Die setup for a hemmed flange used in furniture.

In the past, formative work in sheet metal has been done, aside from doing the radial formatures in the rollers, by a variety of hand and power brakes and folders, admitting of only a minimum of forming by adjustable gages. The practice prevailed of dot-marking the sheet and braking on the dots. This resulted in slow work, not very accurate, because the sheet slipped often past the dot or the men operating the machine did not see the dot clearly enough, or in their hurry of getting the work done, lost no time in a too strict observance of the dot-marks. Then, with the inadequacy of gaging the degrees of the bends, there resulted a wide difference in the shape of the one piece and that of the other piece. It was this lack of uniformity in the formatures of component parts which was responsible for the "bad fit" of parts in assemblies and the "eyesores" alluded to above.

With the invention of the vertically operating brake,



Fig. 2

Round nose with flange formed in one stroke of press.

All drawings of dies and formatures shown in this article are reproduced by permission from Dreis & Krump literature.

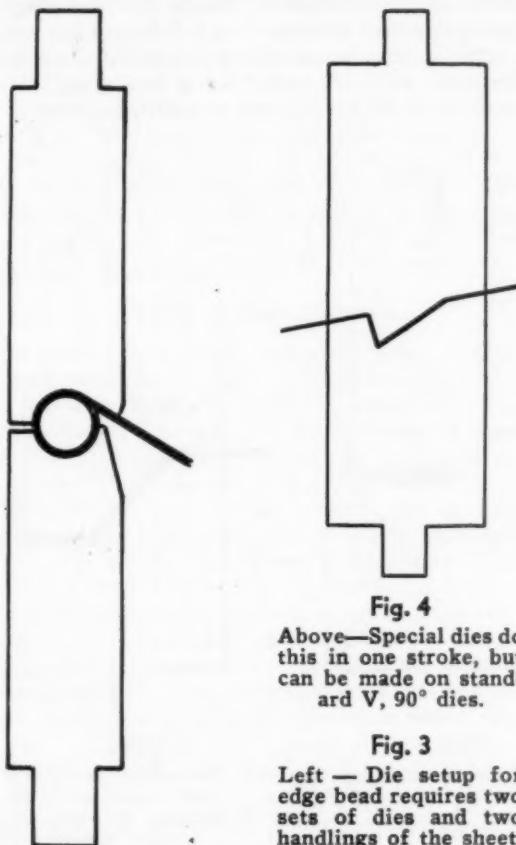
a wide open space was made available between the forms or dies over which the sheet metal was formed. This open space permitted the operator to move the sheet of metal to the front or to the back over the stationary lower die and put it into the exact position before the upper mounted die would strike the metal and bend it. This open space was utilized for the mounting of a variety of gaging means and instruments, adjustable to many positions to hold the metal prior to it being struck by the descending die. This improvement over the older types of brakes has done away with dot-marking of the sheets for braking and has made possible an accuracy between the bends not obtained in the other brakes.

Many Types of Brakes

There are now a great variety of the open space, vertically operating brakes in use which, although designed for and doing different classes of work, still operate on one and the same principle: *that of forms or dies, which might be male and female; one is stationary, while the other moves vertically up and down, descending into or over the stationary die, and forming or piercing or notching the sheet metal that is held in-between.*

By that same arrangement of one form or die pressing against the other, with sheet metal parts in-between, we can do *seaming*; and in the case of soft aluminum or copper rivets, multiple *riveting*.

There are small press brakes, many of them only 2 or 3 feet long, for the express purpose of forming seams and angles in sheet metal parts assembled into boxes, housing, accessories, a variety of light gauge sheet metal utensils, and store and office implements. These machines operate with a speed of one stroke a second, if so wanted, and they form seams and double edges to $\frac{1}{8}$ -in. width with an accuracy not attained by other means. These machines can be ad-



Above—Special dies do this in one stroke, but can be made on standard V, 90° dies.

Left—Die setup for edge bead requires two sets of dies and two handlings of the sheet.

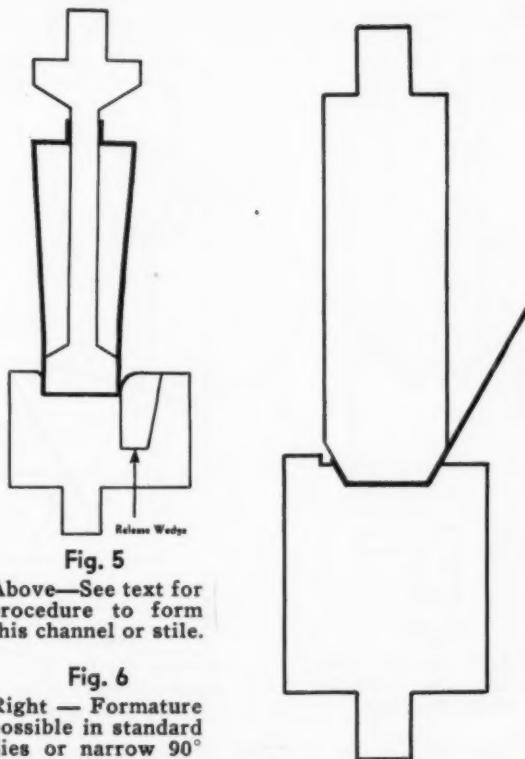


Fig. 5

Above—See text for procedure to form this channel or stile.

Fig. 6

Right—Formature possible in standard dies or narrow 90° die.

justed to any desired stroke speed, but they are operated without a clutch release. Similar machines, 3 and more feet in length, operating without release, are used for various formative work which can be operated at a speed corresponding with the speed of the descending blade or die. Perforations and notching of very thin sheets are done on these machines with equal speed. The use of these machines is confined to sheet metal shops which do mass production work in very light gauges of sheet metal, such as tin plate, brass, copper, zinc, aluminum, soft steel and annealed thin stainless sheets.

Somewhat heavier built machines of the type 4 to 6 feet in length are in use in shops doing metal cabinet, refrigerator, light metal furniture and similar sheet metal product work. But these machines, like the conventional press brake, are operated by a clutch release. This means simply that the vertically moving form or die does not descend until a clutch is released by the operator, which in older makes of press brakes is done by the foot of the operator pressing down a movable bar positioned over the entire length of the machine in reach of his foot. Several makes of brakes have now arranged for a better clutch release because the bar was often put in motion by the one or the other operator inadvertently, or the sheet metal slipped in the hands of the one operator while the other (there being two operators on long pieces of metal) put his foot on the bar, this resulting in many accidents and in spoilage of the metal.

Work Press Brakes Can Do

We shall describe the machines and the forms or dies more specifically in the subsequent chapters of this series when we discuss the construction of the press brake and its operation. In this first chapter we shall confine ourselves to the *work* which the machine does. We see in the drawings accompanying this text a variety of shapes and formatures, each of which was

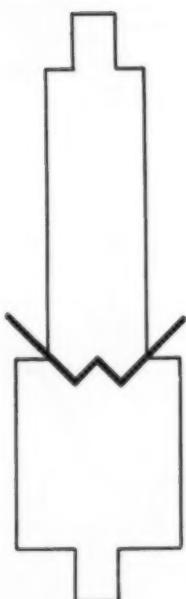


Fig. 7

Standard die for two V's—can be done in single die also.

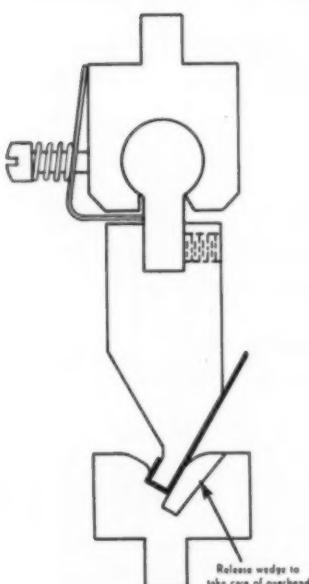


Fig. 14

Rocker die for channel shaped bends—flanges square and parallel.

accomplished by one or more strokes of the die in the press brake. We see that many of the formatures could not be performed in other types of brakes. And even if we could do the shaping in another brake, the position of the turn in the metal would not be as accurate and the turn would not be as smooth and it could not be done in the fraction of the time which it took to do it in the press brake.

The foremost advantage of the press brake lies in the fact that here the metal is held against a "gage" which keeps the sheet or blank in the exact position for the descending die to strike and form the upturn or impress the metal into the desired shape. The *sheared metal edge*, held in position against the gage by the operators so that the metal cannot move, is in all cases preferable to a gaging point of metal already upturned or double-edged, because the upturn and the edged metal have an inherent radial portion which, if it comes to rest against the gage at one point and not at another point, will cause discrepancy in the width of the next upturn in the metal. That also happens if a former upturn in the metal is less than 90 degrees or the brake is not adjusted right to form the upturn to the same degree at both ends of the strip.

How to Plan Gaging

In any press brake forming, the operator who knows his business (and the process-writer who knows his business) will do as many operations as possible by gaging the upturns and shaping in the strip of metal from the *sheared edge*. The man who is learning to do press brake forming should study the formatures in the drawing of a completed sample, with view of determining which upturns it is feasible to do, or which shaping it is practical to do, with the sheared edge of the metal resting against the gage.

This determination, of which upturns or shaping to do first, second, third and last, is the most important function or knowledge in doing formative work on this type of brake.

Fig. 1 of the illustrations shows a very common formature in sheet metal. It is a flange to a cabinet

member, the metal of the flange doubled up or "hemmed" inwardly for strength. If we have a folder long enough, we can hem the metal accurately enough, but the next upturn to 90 degrees of the flange could not be done in the folder without squeezing down the doubled-up metal, which is not desired in this case. For braking the upturn in a common brake we would have to dot-mark the metal and work by the marks, which is not accurate enough for this kind of a job. But in the press brake, to form the hem we simply set the gage for the width of the doubled-up metal, using a so-called "V" die set; adjust the descent of the ram for the prescribed radius bend and receive a 130 degree turn in the metal, which by another operation is flattened down to the thickness of bend desired. Special dies are furnished by the manufacturers for this flattening, but the job can be done as well on standard "flat" die-set.

The next operation, that of the sharp upturn to 90 degrees to form the flange in the absence of the special dies, we can perform with a male "V" die operating in a standard 90-degree female die, or we can use a narrow 90-degree male die with the foregoing female die and complete the job by an adjusted stroke of the male "V" die to bring the flange to its required 90-degree turn.

Simple Press Brake Formatures

As will be evident from the foregoing, the press brake will do swift, accurate work, but the change from die-set to die-set and the adjustment of the strokes will take too much time to use this mode of braking in just a few pieces of metal. But if we have at least one dozen of the pieces to be so formed, the smoothness and accuracy of the bends will compensate for the time. With the aid of the special male die operating in the standard female die we eliminate one operation, that of using the flat die-set for squeezing down the metal, and the radial of the doubling-up will be more uniform and the job smoother. In this instance, with the doubled-up metal presenting a uni-

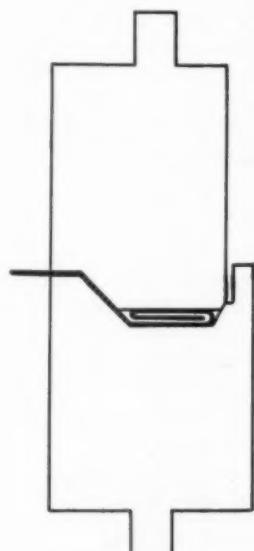


Fig. 8

Die for trebled-up metal and two 45° bends. Trebling as in Fig. 1.

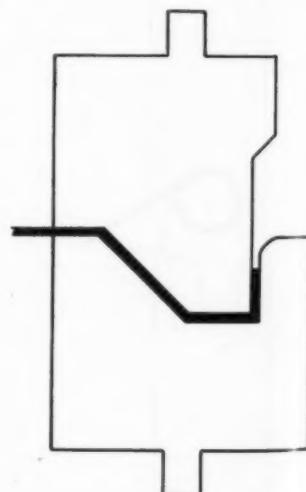


Fig. 9

One stroke setup for light gauges. Two strikes needed in heavy gauge.

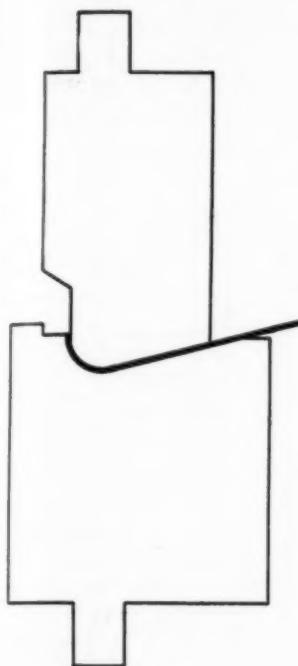


Fig. 11



Fig. 12

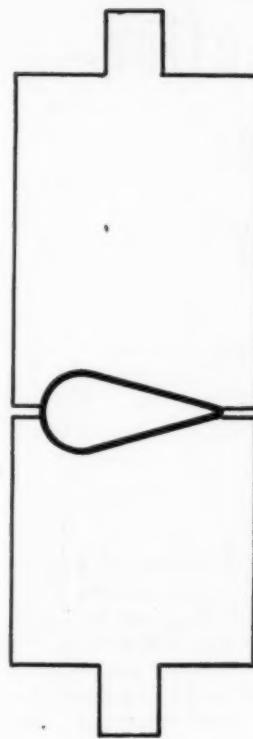


Fig. 13

Left — First operation to form Fig. 13. Both edges must be formed. Step in die is the edge gage.

Center — Die to close sheet. Can also be 11-gauge strip in die holder. V should be sharp enough to cause the edges to close against die.

Right — Special die setup to close formature ready to weld. Can also be done with flat dies, but stroke must be gaged closely.

formly straight edge, it is safe to gage the second metal upturn from the hem.

Fig. 2 shows a special die-set work done on a piece of metal furniture and the formature shown is accomplished by one single stroke in a piece of metal which might be over 8 feet long.

Fig. 3 shows a *bead* formed on the press brake and will be more specifically described as we proceed.

In Fig. 4 we see a formature common in sheet metal fabricating which can be performed by one stroke if we use special dies but which in absence of such dies we can do by three operations in the standard "V" and the 90-degree die-sets. In this formature we have three bends of the metal, each bend having a different degree. In the press brake, working by standard die, we accomplish the varying degrees by adjustment of the descent of the male dies to a certain depth.

Long Flange Upturns

The seemingly difficult formation presented in Fig. 5 we do as follows: (a) provide the strip of metal with the two 90-degree upturns, using standard 90-degree die-set; (b) use that same die-set of a narrow width to make the next following 90-degree turns; (c) change the male die to a narrow "V" die of the required height and adjust the stroke so that the next two turns will be done to about 70 degrees *each*. Then insert a strip of 3/16 inch thick metal between the incompletely formed bends; use standard flat die for the sheet metal to rest on, and strike again with the male "V" die. The two flaring out sides will close together. This procedure might be employed if we work metal above 22 gauge. If we work heavier gauges we had better use a special die designed for doing the last mentioned (the third) operation at one stroke.

Figures 6 and 7 show sheet metal formatures which can be done on either a narrow 90-degree standard die or with the male "V" die. The adjusted stroke

will form 45 and lesser degree bends. In the case of the Fig. 7, if we desire fairly sharp bends we can re-strike them with the "V" male die.

In Fig. 8 we see a formature having trebled-up metal and two 45 degree bends. The metal-trebling is done as described under Fig. 1, using "V" dies for 130-degree bend and then using flat dies for squeezing down. But before we flatten down the second bend we make the 45-degree upturn and then hold the metal in position for the male die to strike outside of the 45 bend. The other 45 bend can be done last. All of the foregoing three numbers of formatures can be done by special dies made for the purpose. In quantity production, such special die-sets are employed. But in absence of these die-sets we can do the work in standard dies as described above.

Fig. 9 formature is standard press brake work accomplished by standard dies, although special dies may be used, saving time and making the part more uniform, with the corners sharp and pronounced. In heavier gauge metals it will be necessary to re-strike the 90-degree bend, bringing it up to the prescribed degree, but the two 45-degree bends can be done in either standard 90-degree die-set or "V" die-set.

Radial Die Work

Figures 11, 12 and 13 illustrate the use of the radial dies. In doing the radial in Fig. 11 we must hold the metal edge tight against the gage and elevate the sheet as the male die strikes it, to prevent the edge of the female die marring the metal. The strip of metal provided with the radials along its length, as shown in Fig. 12, is then formed in the "V" die-set until the metal closes, touching the male die. We might use a strip of 11 gauge thickness steel, the one edge ground to a radius, the other end fastened be-

(Continued on page 112)

Dust Collection in the Foundry*

By S. D. Moxley

Part I

UNDoubtedly the most economical way to meet the problem of prevention of dust in the foundry is to do a good job of house cleaning first and then install the proper equipment for eliminating the dust. There is a methodical approach to the problem in every case, and there are a few basic principles involved which, while familiar to most engineers, are not always practiced in the foundry.

Quite often a system is designed for sand conditioning as well as elimination of dust nuisance. The same equipment can perform both of these operations satisfactorily, as usually they are inter-related. It is not often in the foundry that the recovered material has any economic value, therefore the separation of sizes of particles collected is not important. The problem then naturally breaks down into the following three distinct phases: Apprehension, collection and disposal.

Apprehension

In most cases¹ the apprehension of the dust is the simplest but least understood of the problems. Almost without exception the best place to catch the dust is at the point of creation, as once it is liberated into the atmosphere it is very difficult, if not impossible, to recover.

Use of Hoods.

It is common practice to provide hoods over dusty areas which are fitted with suction pipes leading to the collector. This is illustrated in a general way by A of Fig. 1. In this type of installation the hood should be as small as possible and the openings in the hood reduced to a minimum. It has been found by the writer that with most foundry dust it is necessary to maintain a velocity in all hood openings of from 250 to 300 ft. per min. to prevent dust escaping from the hood. Fig. 1 B illustrates roughly the use of a small hood attached to a flexible exhaust pipe, which has been used quite successfully in connection with snagging wheels for grinding castings. There are many other variations of this principle used in connection with grinding operations.

Fig. 1 C illustrates a close fitting hood applied where dry sand is fed on a belt. The hood openings are kept as small as possible.

When conditioning sand by removal of fines, it is most effective to pass all of the shake-out sand through

¹Paper presented before American Foundrymen's Ass'n Convention

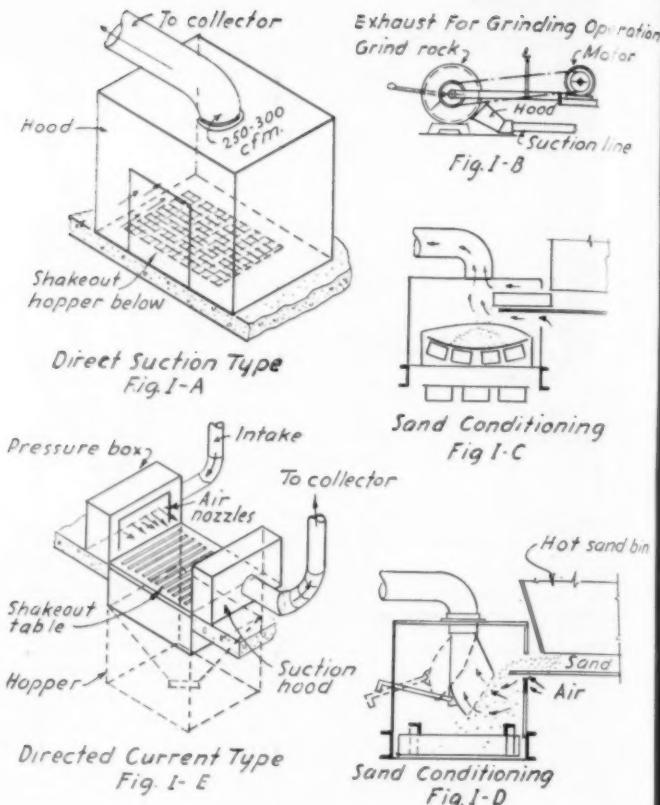


Fig. 1—Typical devices for trapping dust.

a current of air. A successful method of removing the desired size of particles is shown in Fig. 1 D. A constant velocity and volume is maintained in the duct at all times. The end of the duct is provided with a hinged hood having an opening near the sand stream, approximately 50 per cent larger than the duct itself. This hood can be adjusted to varying distances from the sand stream, which regulates the effective velocity through the sand stream and hence the particle size removed from the sand. As the air velocity in the duct is always greater than at the opening of the hood, any particle which is picked up at the hood opening will surely be carried in suspension to the dust collector with no clogging of the air duct.

A method of controlling dust known as the air curtain dust control system has recently been developed and patented which has proved quite successful. Fig. 1 E illustrates its application to a shake-out station. A pressure box is provided with thin slots on the top and sides which keeps a thin layer of air moving at a high velocity over and around the shake-out operation. This prevents the dust generated in the shake-out operation from passing through the air curtain and into the atmosphere. At the other end of the station is a suction hood which receives the projected air curtain and exhausts it along with the dust laden air arising from the shake-out. The air is passed through equipment which removes the dust before it is re-circulated.

In sand conditioning machinery, where the sand is handled in many types of machines and conveyors, there are of necessity large amounts of dust created. It is usually possible, although sometimes inconvenient, to provide practically all such equipment with hoods which are exhausted to a dust collector. The removal of fines for sand conditioning purposes should be done at the shake-out while the sand is hot, as this is usually the first point of origin of dust in the plant. If sepa-

DIAMETER PARTICLE		RATE OF SETTLING IN F.P.M.	SIZE (Not to scale)	VISI- BILITY	NUMBER PARTICLES CU.FT. DENSITY:1			CLASSIFICATION	RECOVERY
MICRONS	INCHES				CITY AVG.	PITTSBURGH	INDUST. PLANT		
.1	.000004				75TRILLION	185TRILLION	370TRILLION	SMOKE	
.2									
.3									
.4									
.5	.00002	.0003			600MILLION	1/2BILLION	3BILLION		
.6									
.7									
.8									
.9									
1.	.00004	.007							
2									
3									
4									
5	.0002	.15							
6									
7									
8									
9									
10	.0004	.60							
20									
30									
40									
50	.002	15	325- 300						
60									
70									
80			200						
90									
100	.004	60	140- 100						
200									
300									
400									
500	.02	555							
600									
700									
800									
900									
1000	.04	790							
2000									
3000									

Fig. 2A—Characteristics of dusts and types of collecting apparatus which are recommended for recovery.

ration is made at this point there would naturally be less dust to escape in the remaining operations. Often-times it is almost impossible to provide suitable hoods for shake-out and cleaning stations. In such cases these departments can be enclosed or moved to a distance from the other operations to prevent atmospheric contamination in the rest of the plant. The men in these departments may be provided with suitable respirators.

Correct Design of Hood Pipes

Correct design of the pipes connecting the hoods to the dust collectors is essential to an efficient system. Branch lines should enter the main at the smallest possible angle and the main should be increased in size proportionately at each connection to prevent variation in the velocity of the air. These branch lines should enter the sides of the main. Dust pipes which incline downward in the direction of flow usually give trouble by clogging.

A system should contain as few elbows as possible and they should be of the longest radius permissible

and never less than 1½ times the diameter as measured on the center line of the elbow. Ordinary foundry dust can be handled with little clogging of the pipes by an air velocity of between 2,500 and 3,000 ft. per min.

Collection

Types of Collectors

In dust collecting equipment for sand conditioning and dust nuisance prevention in the foundry, the following types of equipment usually are considered:

Centrifugal.

Centrifugal (Fan Type).

Cloth Screen.

Cloth Bag.

Electrical Precipitation.

Washer.

Froth-Flotation.

Each of these types has distinct advantages in certain fields and the writer believes there is no particu-

lar type that can be economically and satisfactorily applied to all problems. It should be remembered that every dust prevention job is more or less peculiar in itself, and the equipment selection should be the one best adapted to all phases of the problem.

Dust Characteristics

Fig. 2A shows certain characteristics of dust, and the general range of the various types of dust collecting apparatus with reference to recovery. This chart reproduced from the original supplied by the American Air Filter Co., Inc. has been modified slightly by the writer with reference to range of recovery of grain sizes by some of the equipment suggested for recovery. This has been done to make it more applicable to foundry dusts.

The dust to be recovered should be analyzed for the following:

(a) The nature of the dust from the standpoint of grain size and percentages of the various sizes of particles.

(b) Specific gravity.

(c) Amount of clay or other sticky substances contained.

(d) Moisture.

(e) Temperature.

(f) The degree of fineness it is necessary to collect (this factor is usually determined by the shop conditions and the proximity to the surrounding communities).

Hood Openings

Next, the hoods at the various points of collection should be designed and the areas of hood openings determined. With known velocities the volumes of air can be determined and correct design of air ducts made. These calculations will also show the volume of air to be handled by the dust collector and the pressure under which the system is to operate.

If possible, the probable dust concentration per cubic foot of air which will be delivered to the dust collector should next be determined. Usually, all of this

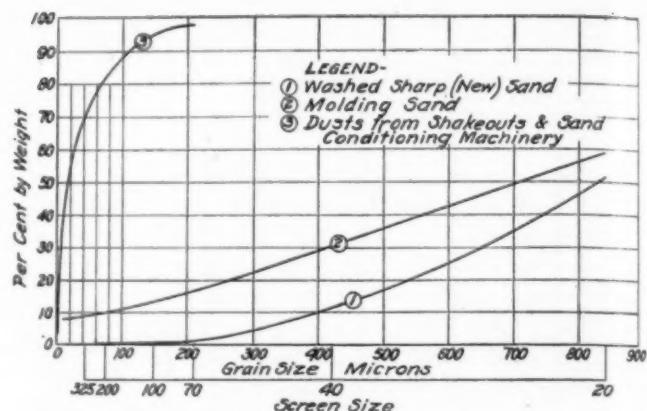


Fig. 2-B—Particle size distribution for new washed sand, moulding sand and dust removed from moulding sand for dust prevention.

information can be determined by the local engineer in cooperation with testing laboratories or engineers representing manufacturers of dust collecting equipment. When these facts are obtained, the chart of Table 1 will assist in the selection of the proper equipment.

Dust Collector Characteristics

Table 1 shows general characteristics of the various collectors when collecting dust, which the writer believes is fairly typical of that found in the foundry. The results shown are based on tests run on dusts arising from shakeouts and sand conditioning machineries in continuous molding operations and in jobbing foundry practice. All tests were run using a concentration of the collector inlet of approximately 5 grains per cubic foot. Figure 2B shows particle size distribution of new washed sharp sand, molding sand with clay added for a binder, and the dust removed from the molding sand for sand conditioning and dust nuisance prevention. Figure 2C shows a particle size distribution of the dust removed from the system to a

Table 1
DUST COLLECTOR CHARACTERISTICS

Type	Style*	Vol. Air Per Sq. Ft. Cloth	Min. Grain Size Microns	Temperature Limits	Moisture Limits	Maximum Dust Concentration Inlet Grs. Cu. Ft.	Concentration 5 Grs. Cu. Ft.	Efficiency 5 Grs. Conc.	Relative Cost 15,000 Cu. Ft. Unit
Centrifugal Collectors.....	A	70-75	800° F	Dewpoint	Any	.75	85%	\$ 750	
	B	70-75	800° F	Dewpoint	Any	.75	85%	1,000	
	C	50-60	850° F	Dewpoint	Any	.50	90%	2,000	
	D	35-40	800° F	Dewpoint	Any	.25 to .10	95% to 98%	2,500	
	E	35-40	1800° F	Dewpoint	Any	.25 to .10	95% to 98%	3,000	
	F	25-30	750° F	Dewpoint	150	.50	90%	2,000	
Centrifugal Fan Type.....	F	25-30	750° F	Dewpoint	150	.50	90%	2,000	
Cloth Screen.....	G	2 Cu. Ft. 10 Gr. 3 Cu. Ft. 5 Gr.	5-10	200° F Above Dewpoint	10	.05 to .025	99% to 99.5%	4,000	
Cloth Bag.....	H	4 Cu. Ft. 10 Gr. 6-8 Cu. Ft. at 5 Gr.	5-10	Cotton 200° Wool 250° Fahr. Above Dewpoint	20	.05 to .025	99% to 99.5%	6,000	
Electrical Precipitation.....	I	.....	Any Suspended Particle	None	None	Any	.....	10,000	
Washer.....	J	.....	5-10	Boiling Point of Liquid	None	.....	.....	4,000	
Oil Flotation.....	K	.....	5-10	Boiling Point of Liquid	None	.017 and up	99.7%	4,500	

*For detail sketches or illustrations of apparatus of these styles, see Figs. 1, 3, 4, 5, 6, 7 and 8.

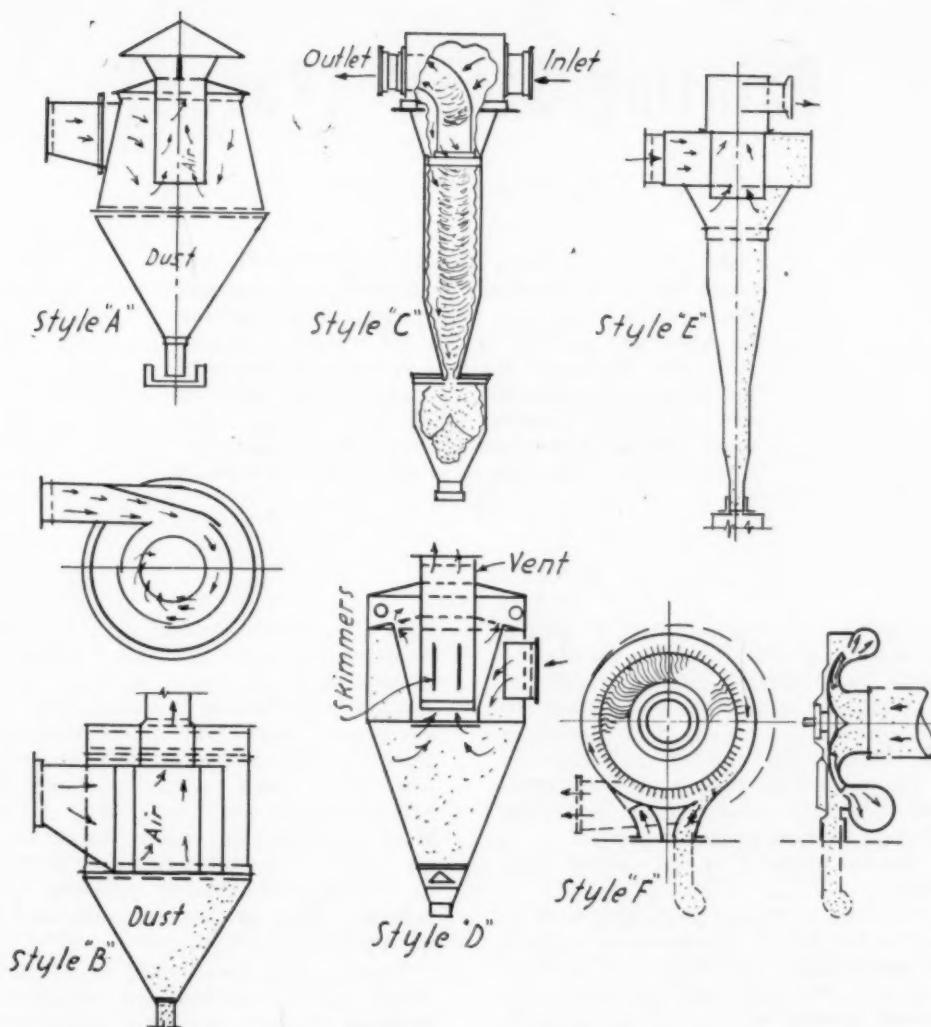


Fig. 3—Six styles of centrifugal dust collectors. Style F is a fan type centrifugal collector.

larger scale and represents the average dust characteristics upon which the values in Table 1 are based. Figure 2D shows particle size distribution of average dust by numbers of particles instead of by weight as is shown in Figure 2C. This curve represents average characteristics of several tests where the sample was obtained by the impinger method and the particles were counted on light and dark fields under a magnification of 500. Particles under one micron in diameter were ignored. It will be noted that the atmospheric distribution curve bears a striking similarity to the curve representing the air exhausted from the bag-

type dust collector. The values shown for volumes of air per square foot of cloth, minimum grain sizes, temperature and moisture limits and maximum dust concentrations represent what the writer believes to be within safe practice for satisfactory operation. Each will collect small portions much finer but will

(Continued on page 110)

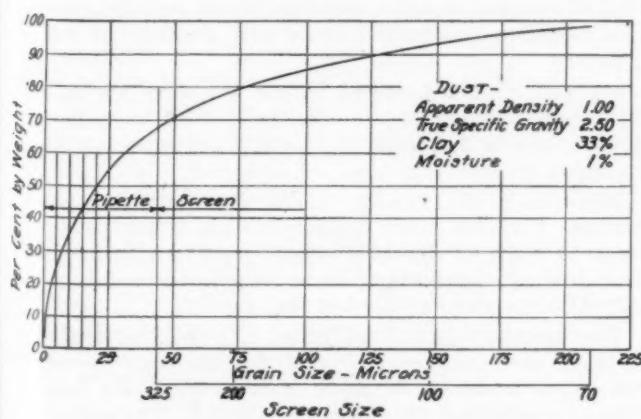


Fig. 2-C—Particle size distribution of the dust removed from the system at larger scale.

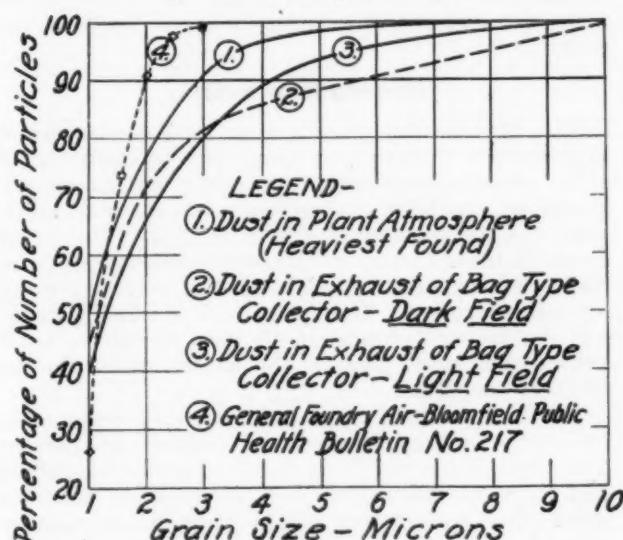


Fig. 2-D—Particle size distribution of average dust by numbers of particles. Count made by using magnification of 500.

Painting Steel* [Part I]

By Wilbur C. Porter

As part of the general research program of the National Bureau of Standards on building materials and structures, a study has been made of the surface treatment and painting of steel for protection against corrosion. The results obtained in the early phases of the work were published as two Building Materials and Structures Reports, BMS8 and BMS44. This paper concludes the investigation with a description of the results of the tests on priming-coat and topcoat paints.

IN THE painting of steel structures, durability of the paint film is a recognized factor in preventing corrosion. Climatic conditions, the composition and preparation of the metal, the adherence and composition of the paint coating, as well as the conditions under which the coating was applied, influence the serviceability of the paint film. Nearly all steel structures are painted either for protective or decorative purposes, and the paint coating must remain as a continuous film over the metal if it is to fulfill these functions properly.

For practical purposes, corrosion tests are made to ascertain which of a number of processes or coatings will protect the metal most completely. It is clear that no laboratory test can fully take the place of a long-period, full-scale service test, and it is not to be expected that these tests, reduced in scale to economize space and increased in intensity to save time, will produce results directly measurable in terms of so many years of actual service. However, it is believed that comparisons can be made from the results of accelerated tests which will indicate to some degree the relative protective value of paint systems. The conclusions in this paper are drawn on the basis of factors affected by conditions peculiar to the individual test, and the results of the outdoor exposure tests may not correlate those in other parts of the country.

Priming Coat Paints

The fundamental factors governing the retention of paint film integrity on metal may be expressed in a few essential requirements; namely, permanent adhesion, distensibility, water resistance, chemical inertness, and the presence of a rust-inhibitor. The extent to which these characteristics are manifested in paint coatings determines their efficacy for protecting metal against corrosion. The advent of synthetic resins and the proper formulation of these for use in paint vehicles has made possible the improvement of some of these properties.

A synthetic resin may be defined as a resin made by synthesis from nonresinous organic compounds. The alkyd resins, used principally in paints, varnishes, and lacquers, are a group of condensation products synthesized by reacting polyhydric alcohols, such as glycerine and the glycols, with dibasic organic acids,

*Reprint of bulletin—"Building Materials and Structures, Report BMS 102," National Bureau of Standards, Dept. of Commerce.

such as phthalic, maleic, succinic, and sebacic. The condensation product is almost always modified to give properties to the resin desirable or essential to the specific application contemplated. The modifying agent may be a drying, semidrying, or nondrying oil; the fatty acid of an oil; a natural resin, such as rosin; a synthetic resin of the phenolic group or of the urea-formaldehyde type. Good adhesion, color and gloss retention, durability, toughness, and flexibility are some of the outstanding characteristics imparted to primings containing properly formulated alkyd vehicles. They are exceptionally well adapted for the baking type of priming and enamel.

The phenolic resins used in paints, varnishes, and other surface coatings are usually oil-soluble types. Modified phenolic resins are phenol-formaldehyde condensation products rendered oil soluble by chemical combination or by physical dispersion in other materials, such as rosin and copal. Unmodified or 100 per cent soluble phenolic resins are condensation products made from tar acids other than simple phenol, which are themselves soluble in drying oils and thinners. The unmodified resins are extensively used in long-oil chinawood varnishes, to which they impart greater drying speed, durability, and resistance to alkalies and gases. The modified types impart the same properties to tung-oil varnishes but to a lesser extent. In addition, they possess considerable hardness and gloss. In general, the phenolic vehicles have very good water, acid, and alkali resistance. The long-oil unmodified types are especially useful in the formulation of exterior marine finishes, which require superior resistance to severe water and weathering conditions.

Oil and phenol modified alkyds are very versatile and combine many of the qualities needed to produce durable paints for general interior and exterior use on metal.

More than 60 priming paints for steel and galvanized surfaces were tested in this investigation. Because some of these primings were duplicates or near duplicates and others were considered unsuitable, only 41 have been included in this report.

The primings have been rated in groups according to their protective value, which in this paper means the extent to which the paint coatings fulfill the function of protecting the underlying metal. The ratings are discussed under the results of the tests and for convenience are included in Table 1.

TABLE 1
Designation, description and group ratings of the priming-coats
Group Rating = 1 is best group; 2, second best; 3, third best, etc.

Designation	Description of primings			Group rating ¹ Galva- nized steel	Group rating ¹ Galva- nized steel		
	Plain steel (pickled in HCl)	Untreated	Phosphate treated		Plain steel (pickled in HCl)	Untreated	Phosphate treated
1 Red lead paint, Federal Specification TT-R-191a Type I, Grade B.....	60	62	1	33	Zinc dust-zinc-oxide priming.....	60	1
Dry red lead.....	20 pounds.				60 percent pigment by weight: 80 percent zinc dust. 20 percent zinc oxide.		
Raw linseed oil.....	5 pints.				40 percent vehicle by weight: V-10 Naval Aircraft Specification Spar Varnish.		
Turpentine.....	2 gills.			34	Zinc dust-zinc oxide-linseed oil paint. Federal Specification TT-P-641, Type I, Class B.....	3	1
Liquid drier.....	2 gills.			35	Zinc dust-zinc oxide-phenolic resin paint. Feder- al Specification TT-P-641, Type III, Class B.....	3	2
25.2 pounds per gallon.				36	Zinc dust-zinc oxide-iron oxide paint.....	2	1
2 Blue lead paint.....	3	3	2		60 percent pigment by weight: 50 percent zinc dust. 20 percent zinc oxide. 30 percent iron oxide.		
Blue lead paste in oil.....	100 pounds.				40 percent vehicle by weight: Phenolic resin-chinawood oil varnish.		
Raw linseed oil.....	2½ gallons.			37	Chlorinated rubber paint pigmented with 27 per- cent aluminum, 41 percent zinc chromate, 14 percent black iron oxide and 18 percent carbon black.....	2	3
Turpentine.....	1½ gallons.			38	Chlorinated rubber paint pigmented with 56 per- cent zinc chromate, 19 percent black iron oxide, and 25 percent carbon black.....	2	3
Liquid drier.....	1 quart.			39	Chlorinated rubber paint pigmented with 88 per- cent metallic lead, 7 percent zinc chromate, 2 percent black iron oxide, and 3 percent carbon black.....	3	2
18.2 pounds per gallon.				54	Red chromate priming.....	2	..
3 International orange paint. Federal Specification TT-P-59. Type A. 18.0 pounds per gallon.....	62	2	1		43 percent pigment by weight: 32 percent lead chromate. 10 percent lead sulfate. 37 percent iron oxide. 21 percent siliceous matter.		
4 Metallic lead and carbon paint.....	62	2	1	56	57 percent spar varnish vehicle by weight. Iron oxide-zinc chromate priming.....	1	..
38 percent pigment by weight: 90 percent metallic lead. 10 percent carbon black.					48 percent pigment by weight: 41 percent zinc chromate. 38 percent iron oxide. 21 percent siliceous material.		
62 percent vehicle by weight, oil and phenol modified glyceryl phthalate resin varnish: 56 percent nonvolatile. 44 percent volatile.					52 percent vehicle by weight: Oil and phenol modified glyceryl phthalate resin varnish. 60 percent nonvolatile. 40 percent volatile.		
5a Iron oxide-zinc chromate metal priming. Post Office Department Specification, revised as of April 7, 1937.....	1	3	1	60	60 percent pigment by weight: 59 percent metallic brown (68% Fe_2O_3). 18 percent Spanish iron oxide (86% Fe_2O_3). 12 percent zinc oxide. 11 percent asbestos.	3	2
6 Aluminum paint. 2 pounds aluminum powder Federal Specifications TT-A-476, Type A, per gallon of varnish Federal Spec. TT-V-81.....	2	1			40 percent vehicle by weight: Long oil spar varnish. 65 percent nonvolatile. 35 percent volatile.		
7 Quick-drying red lead in alkyd (oil type) vehicle. 19.4 pounds per gallon.....	2	2	1	61	79 percent pigment by weight: Zinc dust-zinc oxide-linseed oil paint.....	1	1
8 Zinc chromate priming. Navy Aeronautical Spec- ification P-27b, June 1, 1937.....	1	2	1		78 percent zinc dust. 20 percent zinc oxide. 2 percent litharge.		
9 Zinc dust-zinc-oxide-glyceryl phthalate paint. Federal Specification TT-P-641. Type II, Class A.....	1	1		21	21 percent vehicle by weight: Linseed oil, thinner and drier. 90 percent nonvolatile. 10 percent volatile.		
11 Asphalt varnish, Federal Specification TT-V-51.....	4	3	3	68	Aluminum-zinc dust paint.....	3	1
12 Metallic lead and carbon in phenolic resin vehicle.....	2	1			30 percent pigment by weight: 58 percent zinc dust. 22 percent aluminum. 8 percent zinc oxide. 12 percent inert pigment.		
13 Metallic lead in phenolic resin vehicle.....	2	3			70 percent vehicle by weight: Treated oils and natural resin varnish. 64 percent nonvolatile. 36 percent volatile.		
14 Graphite in linseed oil paint.....	4	2		74	Metallic lead in alkyd resin varnish.....	3	2
15 Metallic lead in phenolic resin vehicle.....	2	3			39 percent pigment by weight.		
17 Metallic lead-blue lead in phenolic resin vehicle.....	3	2		61	61 percent vehicle by weight: 46 percent nonvolatile containing 38 per- cent of glyceryl phthalate.		
52 percent metallic lead in pigment. 48 percent blue lead in pigment.					54 percent volatile.		
21 Zinc dust-zinc oxide priming.....	2	2		75	51 percent pigment by weight: Metallic lead-red lead in alkyd resin varnish....	3	..
68 percent pigment by weight: 60 percent zinc dust. 26 percent zinc oxide. 11 percent siliceous matter. 3 percent white lead.					75 percent metallic lead. 25 percent red lead.		
32 per cent vehicle-vegetable oil and spar varnish.				77	49 percent vehicle by weight (same as 74). Iron oxide-zinc chromate in alkyd resin varnish	1	..
23 Zinc dust-zinc oxide priming.....	3	2			38 percent pigment by weight: 67 percent spanish iron oxide (84% Fe_2O_3). 33 percent zinc chromate.		
76 percent pigment by weight: 35 percent zinc dust. 65 percent zinc oxide.					62 percent vehicle by weight: 45 percent nonvolatile containing 44 percent glyceryl phthalate.		
24 Gray paint for galvanized steel.....	3	2		82	55 percent volatile.		
56 percent pigment by weight: 59 percent zinc oxide. 9 percent white lead. 29 percent siliceous matter. Carbon tinting material present.					Blue lead in phenolic resin varnish.....	3	..
44 percent vehicle-vegetable oil and thinner.					72 percent pigment by weight. 28 percent vehicle by weight.		
25 Natural rubber clear priming. (Aluminum paint in natural rubber vehicle. Topcoat for num- ber 25)......	4	3	2				
27 Pigmented natural rubber priming. (Aluminum paint in natural rubber vehicle. Topcoat for number 27)......	4	3	2				
29 Iron oxide-zinc chromate priming.....	1	3	..				
52 percent pigment by weight: 50 percent iron oxide (85% Fe_2O_3). 25 percent zinc chromate. 15 percent asbestos. 10 percent silica.							
48 percent vehicle by weight: Phenol-formaldehyde resin-chinawood oil varnish.							
30 Zinc chromate priming.....	1	3	1				
45 percent pigment by weight: 80 percent zinc chromate. 20 percent magnesium silicate.							
55 percent vehicle by weight: Phenol-formaldehyde resin-chinawood oil varnish.							
31 Zinc chromate priming.....	1	3	1				
45 percent pigment by weight: 80 percent zinc chromate. 20 percent magnesium silicate.							
55 percent vehicle by weight: Para phenyl phenol-formaldehyde resin. Oil is 50 percent linseed oil and 50 percent chinawood oil.							
32 Zinc chromate-aluminum priming. Similar to No. 31 with the addition of one pound of aluminum powder per gallon of primer.....	1	3	1				

Painting Plain Steel Surfaces

I. Preparation of the Surface

Several theories have been advanced to explain the mechanism of corrosion, but the electrochemical theory is now generally accepted as the best explanation of most types of corrosion. The ordinary metallic surface is not truly homogeneous, chemically and physically, and points of potential difference are sure to exist. In the presence of moisture containing small amounts of dissolved salts, which serve as the electrolyte, a tiny electrolytic cell is formed between anodic and cathodic areas. Under proper conditions, an electric current flows through the electrolyte from the anode to the cathode and from the cathode back to the anode through the metal itself, thus completing the circuit. This electrochemical action causes the metal to dissolve at the anode and hydrogen to be evolved from the electrolyte at the cathode. Obviously, if this action continues, the metal at the anodic areas will gradually disintegrate. The complete absence of moisture precludes the possibility of corrosion by electrochemical action. In other words, the presence of moisture to form an electrolytic medium through which an electric current can flow is necessary for corrosion to take place. Accepting this theory, it is evident that

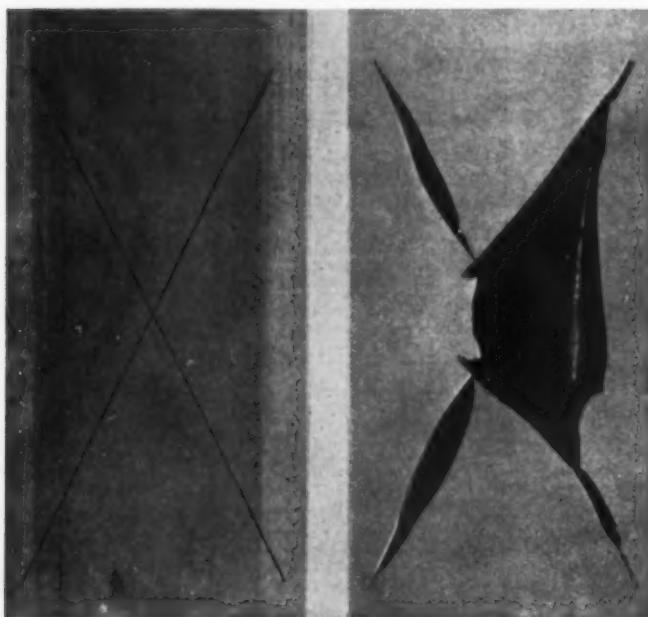


Fig. 1—Comparison of treated and untreated steel panels with same priming and topcoat. Left—hot dip phosphate treatment; Right—no cleaning or treatment.

the less water permitted to come in direct contact with the metal, the less corrosion will take place. Since no paint film today is absolutely impervious to moisture, the need for a pigment possessing sufficient rust inhibitive power is obvious. The flow of electric currents between the anodic and cathodic areas can be retarded by using chemical treatments that form a nonmetallic coating on the metal.

The fundamental requisite of a priming coat paint for any metal surface is that it adheres permanently to the metal. This important requirement should be kept in mind constantly in preparing the surface, and certain precautions should be taken to insure the best performance of the priming coat. All steel surfaces to be painted should be thoroughly cleaned free of grease, rust, loose mill scale, dirt, and other foreign materials that might cause inferior bonding of the

priming. Usually this may be accomplished by the use of scrapers, wire brushes, pickling, sandblast, mineral spirits, or other methods that produce a satisfactory surface. In addition to having a clean surface, it has also been found beneficial to treat the metal with certain chemical solutions. The main objective of these chemical treatments is to form a nonmetallic coating, intimately attached to the metal, which retards corrosion and provides greater adhesion of applied paints. The hot-dip phosphate treatment showed outstanding merit in improving the protective value of paints in all the tests. Particularly effective protection was obtained when this treatment was used in combination with a priming of the inhibitive type, such as zinc chromate. Figure 1 shows two panels having the same priming and topcoat, but the panel on the left was cleaned and given a hot-dip phosphate treatment before painting, whereas the panel on the right was neither cleaned nor treated. The left-hand panel was exposed 12 months to the accelerated-weathering cycle, the right-hand panel 2 months. Extremely poor adhesion is illustrated by the panel at the right. The comparison is shown to emphasize the importance of properly preparing the surface before painting.

2. Results of Accelerated-Weathering and Outdoor Exposure Tests of Priming Coats on Plain Steel

Of the primings listed in Table 1, 32 were tested on plain-steel panels. The panels were cut from hot-rolled, 22-U. S. Ga. sheet steel, and were pickled in an acid solution to remove rust and mill scale. The kind of acid used for picking—whether hydrochloric, sulfuric or phosphoric—made no perceptible difference in the results. The hot-dip phosphate treatment improved the protective value of the primings, but the relative ratings are essentially in the same order whether the primings were applied to phosphate-treated or to acid-pickled steel. After pretreatment, the panels were brushed with two coats of priming, a week being allowed for drying between application of coats. A topcoat of outside finish paint was then applied, in some cases to one-half and in other cases to the entire surface of each panel. The painted panels were scratched diagonally to the metal before being tested.

According to the results obtained from the accelerated-weathering machine and the outdoor exposure tests, the primings on steel have been rated in groups in the following decreasing order of merit with regard to durability and effectiveness in protecting the metal:

- Group 1: Primings 5a, 8, 29, 30, 31, 32, 56, and 77.
- Group 2: Primings 1, 3, 7, 36, 37, 38, and 54.
- Group 3: Primings 2, 4, 15, 17, 34, 35, 39, 60, 68, 74, 75, 82, and 83.

- Group 4: Primings 11, 14, 25, and 27.

The primings in group 1 are composed of zinc chromate or a combination of zinc chromate and iron oxide in a water-resistant, tough, very adherent, hard-drying vehicle. Synthetic resin varnishes, such as the phenol-formaldehyde and glyceryl phthalate types, undoubtedly play an important role in the performance of these primings. A paint system consisting of this type of priming over a phosphate-treated surface, and having a properly formulated top coat, combines to a high degree the essential properties governing paint-film protection of steel against corrosion. The primings in group 2 gave very good results in the outdoor-exposure test, but in the more severe accel-

(Continued from page 114)



THE PICTURE IS FAMILIAR, BUT THE FACTS ARE NOT

To any worker in sheet copper this picture will appear familiar. But the fact is, it was taken in the Sheet Metal Research Laboratories maintained at Rome, N. Y., by Revere. It shows the construction of a 65-foot gutter of sheet copper, a duplicate of an actual installation. The bulbs in the upper left corner are 250-watt electric heaters. When the gutter was completed, the current was turned on and the metal heated to summer temperatures. Then the heat was turned off and the gutter was flooded with cold water. This was repeated time and again, compressing into a few weeks the service conditions of many years.

From this and other tests and experiments Revere learned new and vitally important facts. We discovered the correct gauges and tempers, and, even more important, the right ways to design and install gutters and roofs so as to prevent buckling and assure almost endless life. In addition, we

found how to make repairs to old gutters so they will give the same service as new ones installed according to the new methods.

Thus, true engineering principles have been brought to the problems of copper roofing. Those principles will be explained in plain, simple language, with many diagrams, in a new Revere booklet to be made available. On request, we will put your name on our list to receive a complimentary copy when issued. Write the Revere Executive Offices.

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
Executive Offices: 230 Park Ave., New York 17, N.Y.

ASSOCIATION

Activities



14th Warm Air Conference Cancelled

The fourteenth Annual Warm Air Conference, the fourteenth year of emphasis on economy of fuel and material in the home heating field—vital to the war effort—scheduled to be held March 19, 20, 21 and 22, and for which a complete program had been arranged with prominent speakers and instructors from industry, University of Illinois and Michigan State College, has been cancelled.

The new "Code and Manual for the Design and Installation of Warm Air Winter Air Conditioning Systems" was to be used as the method of checking a house design.

New York State War Conference

New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., is inviting delegates only from the various groups between Westchester County and Niagara Falls, to bring attendance under the 50 mark for their "1945 War Conference" to be held March 20-21 at the Sheraton Hotel, Rochester, in place of the annual convention originally scheduled for those dates.

The greater part of the attendance will come from the City of Rochester and surrounding towns within 15 to 25 miles, and this will not cause any undue hardship on traveling.

The merchandisers—the auxiliary—will hold their own convention.

CLARENCE J. MEYER, State Secretary.

Michigan

Michigan Sheet Metal, Roofing, Heating and Air-Conditioning Contractors' Association, Inc., received the following telegram on February 6th:

"Your application for permit to hold meeting Flint, March 8 and 9, has been reviewed. Committee feels that meeting can reasonably be deferred until necessity for restriction ends. Permit therefore denied."

R. H. CLARE,
Secretary War Committee
on Conventions."

It is with the deepest regret we are forced to cancel this convention.

New York City

The Roofing and Sheet Metal Crafts Institute, Inc., New York 14, publishes the Institute Ticker monthly—8 pages, 8 1/2 by 10 1/2—the December issue carrying advertising of manufacturers and jobbers in the area, news from the Department of Labor on post-war capacity, a summary of government regulations, a list of "our boys in the service," and the following officers to serve the Institute for another year:

President—Lawrence C. Corvi, Greenwich Roofing Works, Inc., New York.

Vice Presidents—Albert F. Neuscheler, A. C. Gmelin, Inc., New York; Charles F. Muller, Brooklyn; Martin J. Hale, M. Barry Roofing, Co., New York.

Treasurer—Irving Koppelson, N. Koppelson & Son, New York.

Corresponding Secretary—Eugene L. Packer.

Recording Secretary—Albert L. Lauber, A. Lauber's Sons, New York.

Sgt.-at-Arms—Cornelius Muller, Rudolph E. H. Muller Sons, Bronx.

Board of Directors—Thomas J. Wynne, T. Wynne Roofing Co., New York; Cornelius Muller (3 years); Harry Weissman, Hudson Roofing & Skylight Works, New York.

The masthead of the Institute Ticker" carries the "emblem of an ethical shop."

The November "Institute Ticker" carried the following Code of Ethics drawn up by the Ethics and Grievance

Committee, of which Eugene L. Packer is chairman, recently adopted by the Institute:

1. Be it resolved that our profession is an honorable one and affects the well being and health of our community and country; that we pledge ourselves to serve our clients with the same integrity that the doctor does when he binds himself to abide by his Hippocratic oath and the lawyer his Socratic oath.

2. In estimating, we will endeavor to use our experience and knowledge to recommend that which is best for the job whether it be small or large. Jobs are not to be "built-up" for sales purposes, nor "camouflaged" substitutes to be offered as complete roofing where complete roofs are needed.

3. Estimates to be written in a clear and standard manner with regard to specification of what is to be done, how it is to be done and what materials are to be used.

4. Specifications to be rigidly adhered to—even if it hurts.

5. Guarantees to be lived up to in spirit as well as the letter of the contract. In giving guarantees, the length of guarantee shall not be excessive or beyond the usual time the trade in general is accustomed to guaranteeing that particular type of job.

6. A Board to be appointed to adjust grievances and complaints of customers against contractor members of this Association and to adjust grievances between fellow members; all contractor members to abide by the decision of this Board.

A "Swap Column" also appears, listing equipment and materials wanted or for sale.

Lawrence C. Corvi, President

Frank G. Sink of Indianapolis Passes

Frank G. Sink, President of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, passed away February 5, 1945. He has been a faithful worker in the association for a number of years, serving as officer and director and as president for the past two years. He had given many hours work to this association, promoting and furthering the benefits of the organization to members and non-members of the association.

Mr. Sink was a member of the National Warm Air and Sheet Metal Association—Indianapolis local association, secretary and treasurer of Sink and Edwards, member of the Universal Club, Past Master and Treasurer of his Masonic lodge, member of Scottish Rite and Murat Shrine, and chairman of the Board of Trustees of his church. Frank Sink has always attended the conventions and was always mildly interested, but more recently took active part.

Frank Sink and Homer Edwards of Sink & Edwards formerly worked for the same company and in 1909 went into partnership for themselves. They were incorporated in 1913 and through the many years of their association, they have prospered. Their growth has been steady and at the time of his death their volume had grown to one of the largest sheet metal, furnace repairing and roofing businesses in the State. They were particularly noted for their volume of ventilating work which they did as subcontractors to heating contractors in the Central Indiana area. In 1935, they entered into the re-roofing business and in the past year they had roofed nearly 400 residences in Indianapolis.

Sink & Edwards handled the big Scottish Rite Cathedral job, rated as one of the twelve most beautiful buildings in the world. Several Indianapolis contractors got their start as Sink and Edwards foremen. Lash of Larsh Sheet Metal Works was a former Sink & Edwards foreman.

Homer Edwards, the remaining partner, looked after the outside work mostly and Frank Sink ran the office, the financing, accounting, etc.

At the present time the company is engaged in defense work and has just been awarded a contract for their own building to afford more shop room for the execution of these contracts.

Association Activities . . .

Illinois

Directors and officers of the Sheet Metal Contractors' Association of Illinois met at the Jefferson Hotel, Peoria, on January 6. Only three were absent and one of these—Joe Walters—was sick.

Motion was made and seconded that the secretary write National Secretary Clarence Meyer regarding manufacturers advertising of electric controls for furnaces and ask him to take the subject up with Controls Division of the National Warm Air Association, in regard to price being printed on advertising.

Motion was made and seconded that the 1945 State Annual Convention will not be held as James F. Byrnes of Washington, D. C., requested.

Motion was made and seconded that the secretary mail a bulletin regarding state sales tax to all members.

The bulletin says, "Pay sales tax only on sales over the counter. This means what you sell and the buyer installs or erects himself. If you install or erect the material you sell, there is no sales tax due."

Motion was made and seconded that the secretary mail out statements for 1945 dues of \$5 to all members.

Motion was made and seconded that Directors and Officers hold regional meetings in different parts of the State during the year.

W. R. SHAW, Secretary.

Cook County, Illinois

The Sheet Metal Contractors Association of Cook County held their regular meeting at the Atlantic Hotel on January 17, at 2 p. m.

Committee appointments was the first order of business and these were substantially the same as for 1944.

There was considerable discussion on executive order 9240 and the directive of November 28, 1944, which abolished the time and half directive issued by the Department of Labor on April 11, 1944.

Our next meeting is scheduled for February 21, at which time we will have Mr. Morrell of the Revere Copper and Brass Company speaking on "Magnesium."

Wm. J. Perkinson, President

W. G. Wise Passes

Wilbert G. Wise, 75 years of age, president of the Wise Furnace Co., Akron, Ohio, died on February 5. Mr. Wise organized the company which bears his name in 1904 and was active in the business until his death.

Mr. Wise was a charter member and the first treasurer of the National Warm Air Heating and Air Conditioning Association formed in 1914. He was elected the third president of the association in 1918 and served as president from 1919 to 1921.

After the warm air Research Residence was built in Urbana, Illinois, Mr. Wise was one of the three members of the Board of Trustees created to hold title to the property.

He is survived by his son, Atlee Wise.

W. G. Wise at the time he assumed the presidency of the National Warm Air Heating and Air Conditioning Association in 1918.



Dayton, Ohio

On Thursday evening, January 25, 1945, at 6:30 o'clock, the Sheet Metal, Furnace and Roofing Contractors Ass'n of Dayton, Ohio, entertained its members, their wives, and their colleagues with a turkey dinner in the ballroom of the Van Cleve Hotel. During the dinner, they were entertained musically by a trio, known as the "Aristocrats of Song."

Following the dinner, Vince Wehner, chairman of the entertainment committee, presented the master of ceremonies, Ray Barrett. With a cordial welcome to everyone, Mr. Barrett introduced the president of the association, Harry Kenney, to be the first speaker. One of the amusing highlights of Mr. Kenney's speech was the list of old prices of sheet metal articles, which were extremely low compared to the present time prices.

Then Mr. Ehlers, of the Dayton Builders' Exchange, spoke a few words, complimenting the association for its fine achievements and assuring the members that he would be pleased to help them in any way possible.

Mr. Bates, the warm air heating inspector, expressed his gratitude to the members of the association for their splendid cooperation with him.

The association was greatly honored to have present one of the founders of this local organization, Frank Hoersting. He presented a very interesting talk, giving a brief history of the association.

Mr. Barrett then introduced the members of the board: Artie Smith, Leo Budde, W. W. Barnes, and Al Hoersting.

Next A. J. Hoke, the secretary and treasurer, was introduced who purposely gave quite an exaggerated account of his experience in making arrangements with the entertainer of the evening.

This led up to the humorist and final speaker of the evening, Dusty Miller, introduced by the master of ceremonies. His talk, though humorous, had quite a serious note woven into his theme.

The evening was completed with a technicolor movie of the Glacier National Park, showing the beautiful scenery observed during a six day horseback trip through the park.

A. J. Hoke, Secy.-Treas.

Midwest Stoker Association

At the annual meeting of the Midwest Stoker Association, Chicago trade organization of leading stoker distributors and service agencies, held at the Builders' Club in Chicago on February 7th, all incumbent officers and members of the board of directors were re-elected for another term expiring January 1, 1946. The officers re-elected were as follows:

John J. Hayes, President, of the Auburn Stoker Company; William J. O'Neil, Vice President, of the Iron Fireman Manufacturing Company; and Joseph G. Beard, Secretary-Treasurer, of the Illinois Iron and Bolt Company. Members of the board of directors re-elected were as follows: Messrs. Hayes, O'Neil and Beard; F. H. Herndon of the Link-Belt Company; and F. J. Moran of C. E. Sundberg Company. President Hayes re-appointed the following as chairmen of the organization's standing committees: Labor Relation—E. W. Jones of the Iron Fireman Manufacturing Company; Engineering—E. M. May of the Steel Products Engineering Company; and Membership—W. J. O'Neil.

The Association approved a course of instruction on the care and operation of underfeed stokers prepared by its Engineering Committee, which will be given before several thousand Chicago flat janitors at a series of meetings to start in April or May in cooperation with officials of the Chicago Flat Janitors' Union. Instructors will be members of the Association's Engineering Committee. Sample copies of the instruction course will be made available to other stoker and allied trade organizations after the schools for janitors in Chicago have been completed.

For your convenience a number has been assigned to each item. Circle the items in which you are interested on the coupon on page 100 and mail to us.

△ Indicates manufacturer not listed in 1945 Directory.
● Indicates manufacturer not listed in 1945 Directory.

1—Aluminum Shutters

Elgo Shutter & Manufacturing Co., Detroit, Michigan, announces its shutters will again be made of aluminum, as in pre-war days.

Due to the fact that aluminum became a critical material in the early



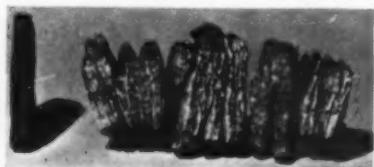
days of the war, it became necessary in the Spring of 1941 to change over to steel.

The shutters which will commence coming off the production line early in January will be of the design followed in pre-war days, but will have improvements and refinements which will give them added advantages.

The company will continue distributing its products exclusively through manufacturers of fans, blowers, exhausters and air conditioning equipment.

△ 2—Alexite

AleXite, a light type of vermiculite mined by the AleXite Engineering Co. of Colorado Springs, Colorado, at two Colorado mines, is now available to the roofing trade in raw ore form. It costs only a few dollars per ton, is ready for expansion in the roofing



contractor's simple gas-fired furnace and is sold for many kinds of insulation.

It can be easily applied as a loose fill insulation without applicators. AleXite pours easily and uniformly from a sack to fill all voids, and has high heat resistance. It will not support vermin, will not settle, and is fireproof, sound-deadening and everlasting.

Plasterers are substituting it for sand in plaster and stucco for its insulating and fire-proofing advantages.

In the AleXite thermos conductivity preliminary test machine the K factor now shows .40 although final determinations have not been completed.

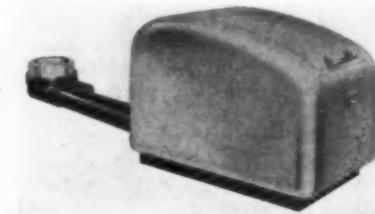
3—Domestic Stoker

Conco Engineering Works, Mendota, Illinois, announces that it will shortly introduce a new domestic stoker.

The new Conco domestic stoker is attractively finished in red, black and aluminum. The hopper, despite its large coal capacity, has a marked lower filling height.

The Conco Inter-planetary Transmission utilizes the powerful internal gearing design which places eight teeth in constant contact. A simple and convenient selector lever permits an infinite number of coal feed adjust-

ments without changing the position of the belt or stopping the motor. It also maintains automatically the correct belt tension at all times. The Air-meter, designed on an entirely new and different principle, assures correct combustion under varying conditions by automatically adjusting the flow of air to the constantly changing fuel bed demands.



ments without changing the position of the belt or stopping the motor. It also maintains automatically the correct belt tension at all times. The Air-meter, designed on an entirely new and different principle, assures correct combustion under varying conditions by automatically adjusting the flow of air to the constantly changing fuel bed demands.

The dust-tight, air-tight hopper is provided with forced ventilation through an air jet, to prevent back-gassing into the basement and also to insure against corrosions that usually results from gases attacking the metal parts.

In the new design, Conco engineers have done away with the shear pin or the clutch. In the event of an obstruction, an electric overload switch stops the motor and automatically restarts it after the obstruction is removed. The new retort is of one piece construction, designed to burn efficiently a wide variety of coals.

● 4—Spin Dimpler

Topflight Tool Co., Chestnut Ave., Towson 4, Md., is marketing a spin-



The new Spin Dimpling tool is made for 3/32, 1/8, 5/32 and 3/16 AN 426 rivets. No special machinery is required. Spin dimpling can be done on any standard drill press.

Dimples made by the new Spin Dimpler are free from cracks and a sharp corner at the face of the sheet is obtained.

△ 5—Stock Cart

Lyon Metal Products, Inc., Aurora, Ill., recommends its stock handling cart as an industrial aid for expediting plant operations.

The cart shown is model No. 2000-11-30 in. long, 16 in. wide and 32



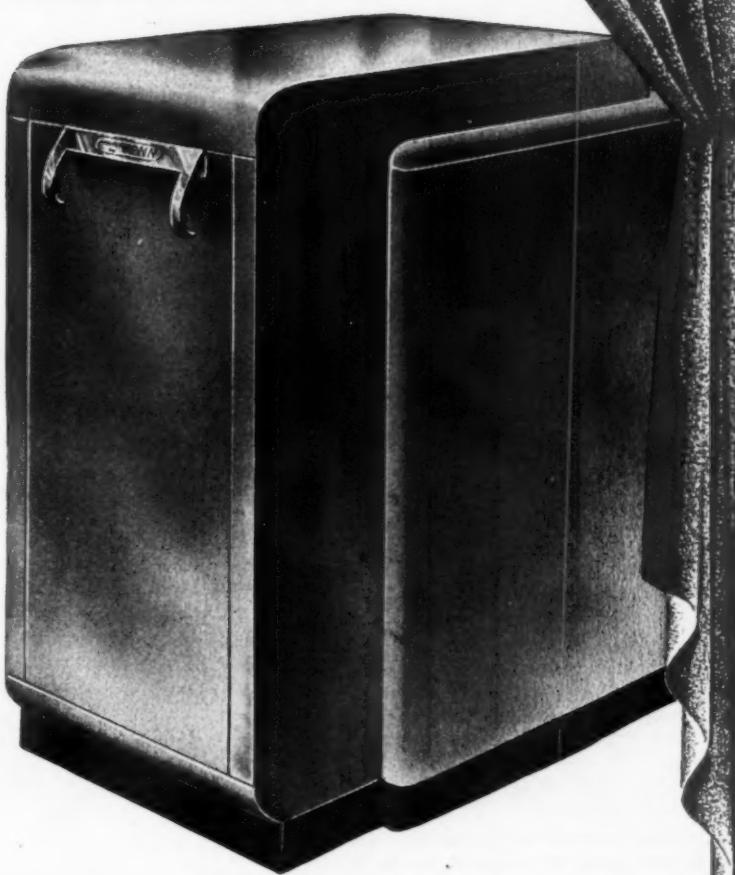
in. high—overall. Extra center tray may be had. The desk accessory is 16 in. wide and 14 in. deep with a 5 deg. slope.

This cart is finished in Lyon green baked enamel and is shipped set up.

THIS IS THE NEW PENN PACKAGED BOILER-BURNER UNIT

NOW RELEASED FOR PRODUCTION

- Completely Factory Pre-fabricated
- *Gas or Oil Fired Boiler Burner
- New, Improved Fire Travel for Better Heat Transfer . . . Low Stack Temperature
- New Penn "Volatoil" Feed Preheats Oil for Peak Combustion Efficiency
- Unit Self-Supporting . . . Needs No Foundation
- Installation Labor Cut Up to 90%
- No Basement Engineering Guesswork



Penn Packaged Boiler-Burner Units, refined, improved and completely packaged, will soon be coming off the assembly lines.

Spot re-conversion permits us to make a limited number during the early months of 1945. "Wrapped up" in a modern jacket, these new heating packages will put Penn Dealers far ahead in the field of sales. Check the outstanding performance features listed above. Soon we'll show you exactly what's inside to

back up our statements. (A cut-away detail illustration of this and other Penn Units will appear in an early advertisement.)

Dealers who are still looking for modern heating equipment . . . units that will be salable as only a complete package can be . . . are invited to write or call us today. You'll find Penn an aggressive and cooperative manufacturer, thoroughly equipped to fill the demands for finer domestic heating.

Packaged
by

PENN

BOILER-BURNER UNITS
AIR CONDITIONER UNITS

PENN GUNN WATERS HEATERS
HYDRO-AIRE (Split System)

PENN BOILER and BURNER MANUFACTURING CORP.

LANCASTER, PENNSYLVANIA

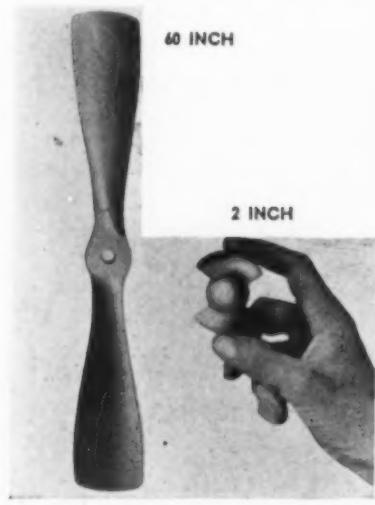
New Products . . .

For your convenience in obtaining information regarding these items, use the coupon on page 100.

6—Fan Propellers

Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 11, announces two new high efficiency axial flow fan units.

Performance by ASH&VE standard code of test is as follows: The 60-inch low pressure propeller driven with a



10 h.p. 1150 r.p.m. motor delivers approximately 60,000 cfm free air and 5,000 cfm at $\frac{1}{2}$ -inch S.P.

In addition to highly specialized fan units Dynamic manufactures a complete range of low and high pressure fans designed to operate at speeds from 870 rpm through the normal range of A.C. speeds and into series wound and high cycle speeds up to 14,000 rpm or more.

All these fans from the 2-inch to the 60-inch are being built in both single stage and multi-stage varieties. Two-stage assemblies double the single stage pressure characteristics of any given unit. When multi-stage assemblies are built, guide vanes or contra vanes are employed to straighten the air stream between the various stages.

• 7—Copper Plating Aluminum

Technical Processes Division, of Colonial Alloys Company, Philadelphia 29, announces adherent, uniform copper plating is now possible on aluminum and its alloys by means of a simple preparatory dip at room temperature.

Copper plating on aluminum brings greater utility to this light metal. Since aluminum is difficult to solder, a flash coat of copper eliminates this difficulty.

Aluminum also has a strong tendency to develop an insulating oxide

coat, by mere air exposure. While aluminum itself is a good electrical conductor, this oxide coat growth on its surfaces reduces this conductivity considerably. When aluminum is copper plated this difficulty is overcome and this light metal becomes useful for electrical contacts and high frequency conductance.

Copper plated aluminum serves as a base for further plating, such as nickel, cadmium, chromium, zinc, etc.

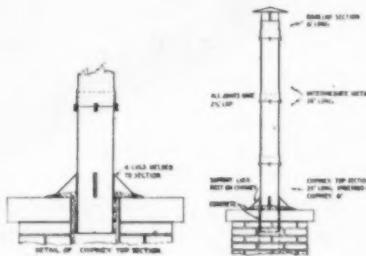
Since copper can be colored by various means well known in the art, copper plated aluminum can therefore be finished in many light-fast colors for decorative and identifying purposes.

The process consists of a specified means of aluminum cleaning and preparation, followed by a 10 to 30-second immersion in a simple dipping solution at room temperature and then plating from the known copper plating electrolytes.

8—Chimney Extension

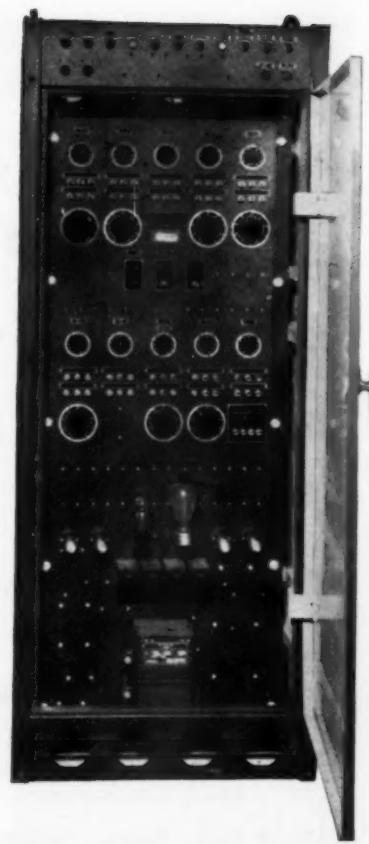
Condensation Engineering Corporation, 2515 S. Archer Ave., Chicago 8, has developed a new prefabricated porcelain enameled chimney extension to increase the height of brick chimneys troubled with poor draft or a downdraft.

The extension is made of heavy-gauge steel covered with two coats of acid-resisting, porcelain enamel



fused into the steel at 1575 deg. F. This porcelain enamel coating insures long life, being rust-proof, heat-proof, acid-proof, and alkali-proof.

This extension requires no guy wires and can be equipped with a rain cap or revolving ventilator cap. Installation is made by inserting the chimney top section into the top of the chimney with the four support lugs resting on the capstone or first layer of brick and grouting it into place with cement. A support for the cement is cut on the job and can be made of sheet metal, cardboard, or anything that will hold the cement in place while it is setting. Twenty-four inch sections of vitroliner may then be added to reach the desired height. Four lugs are provided on each end of the section for bolting them together.



9—Weld-Sequence Timer

General Electric Company, Industrial Control Division, Schenectady, New York, offers a new weld and sequence timer for providing the various time and current adjustments necessary for welding heavy sections of air-hardenable steels. Type CR7503-F170 timer is especially designed for use with a G-E ignitron contactor and a heat control panel. It can also be used in combination with most G-E spot-welding controls which include the phase-shift method of heat control.

Operating from 230/460/575 volts, 60 cycles, the control adjusts the time of current flow and its magnitude for preheating, welding, grain refinement, and tempering. Other adjustments control the time for chilling the weld-nugget following the weld and grain refinement periods. For variations in control voltage of plus ten to minus twenty per cent, consistency of timing will be within plus or minus one-half of 1 per cent of the time setting.

This control consists of nine time intervals, seven independent heat adjusters, two pressure interval timers, one squeeze timer, one hold timer, and provisions for a two-stage foot switch, all housed in a steel enclosure. Control adjustments are easily accessible on the front of the panel and each timer has a separate time adjustment and an indicating light, which gives a quick indication of which timer is in operation. The heat control potentiometers have large graduated dials which enable accurate heat settings.



New way of sh-h-hushing **FAST AIR!**

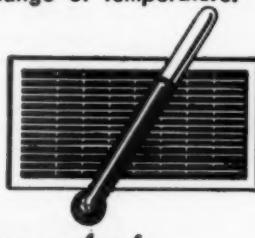


CAREYDUCT "soaks up" sound . . . hushes air noise . . . won't "telephone" fan or other noises . . . is 40% to 50% quieter than ordinary duct.



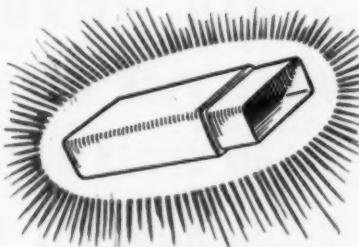
EASY, LOW-COST INSTALLATION. Careyduct eliminates six labor operations. Uses simple, factory or job-built fittings. No special tools. Adapts to standard grilles and dampers.

HIGH THERMAL EFFICIENCY!
Careyduct delivers either hot or cold air with a minimum change of temperature.



Carey duct — an insulated duct made of asbestos—can be used in smaller sizes because it handles higher velocities quietly and efficiently. Careyduct—being 40% to 50% quieter—can handle velocities up to 2500 feet a minute easily and quietly compared with a maximum of 1400 feet a minute for ordinary duct. Careyduct is proving itself today on many large industrial and governmental installations. Write for engineering data on capacities, characteristics and specifications.

Carey



CAREYDUCT itself is trim, smooth, good looking. Or it can be painted or decorated to harmonize with any interior.



LESS FRICTION-LOSS BY TEST. Careyduct's smooth surface and flush joints eliminate leakage, "breathing" or vibration. It's fireproof.

IN CANADA: THE PHILIP CAREY CO., LTD.
OFFICE AND FACTORY: LENNOXVILLE, P.Q.

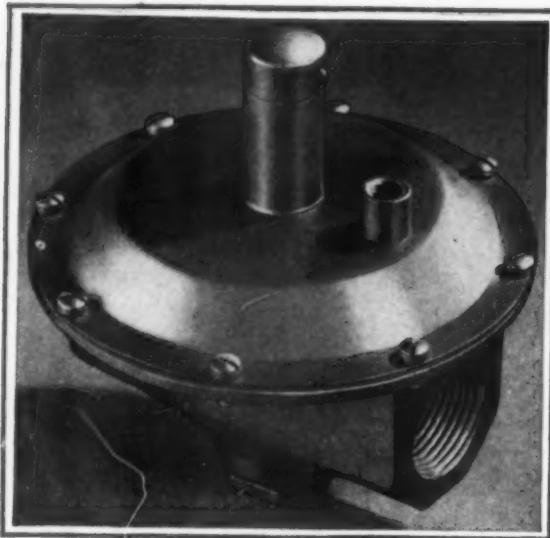
THE PHILIP CAREY MANUFACTURING COMPANY
LOCKLAND, CINCINNATI, OHIO

Other Carey Products: Industrial Insulations • Rock Wool Insulation • Asbestos Shingles and Siding • Asphalt Shingles and Roofings • Built-up Roofing • Roof Coatings and Cements • Waterproofing Materials • Asphalt Tile Flooring • Pipe Line Felt • Expansion Joint • Asbestos Wallboard and Sheathing • Miami-Carey Bathroom Cabinets and Accessories.

GENERAL CONTROLS

V-300

Low Pressure Gas Regulator



CHECK THESE 3 Big Advantages

V-300 HIGH CAPACITY

V-300 CLOSE REGULATION

V-300 NOMINAL COST

Here is a low pressure Gas Regulator that answers every requirement for a small, compact, high quality regulator that will provide high capacity and close regulation, yet be reliable and trouble-free.

The V-300 regulator is scientifically designed to resist corrosion from all types of fuel gases, and is precision-built with the finest materials available to insure continuous and efficient appliance operation.

For complete specifications on gas regulators, solenoid valves, safety valves, fuel governors and thermostats for the Gas Industry, write for Catalog 52B or contact nearest General Controls Factory Branch or Distributor.



New Literature

For your convenience in obtaining copies of New Literature use the coupon on page 100.

100—3-M Grinding and Finishing

Minnesota Mining and Manufacturing Company, Saint Paul, Minnesota, has just released four new publications illustrating and describing the 3-M Method of Grinding and Finishing.

The largest booklet entitled "Step Up Production With the 3-M Method of Grinding and Finishing" is designed to provide up-to-the-minute facts and information on this grinding and finishing method, in concise, practical and usable form.

The booklet includes action photographs of production jobs, a formula for determining abrasive belt sizes and placement of backstand idlers, complete data on 3-M Abrasive Belt sizes and grits and Segment Face Contact Wheels available to licensed users without royalty.

The three smaller booklets in the series deal individually with the 3-M Method as applied to the grinding and finishing of small parts and tools, heavy duty grinding and finishing of flat or curved surfaces, and the 3-M Method employing a semi-portable unit for grinding and conditioning raw metal stock—armor plate, billets, sheets and tubes—and for cutting down large welded areas.

101—Superior Fluxes

Superior Flux Company, 913 Public Square Building, Cleveland, Ohio, announces a new catalog describing the complete line of "Superior" Fluxes. Included are 20 fluxes for welding, brazing, silver soldering, soft soldering and low temperature alloy welding of ferrous and non-ferrous metals and alloys.

Fluxes for silver soldering and similar operations are offered in both paste form and powder form. Different fluxes are available for welding, brazing and soldering all forms and alloys of aluminum. For cast iron and for copper there are both welding and brazing fluxes, and for stainless steel there are welding and soldering fluxes.

For each flux listed there is included a detailed statement of its characteristics and a full schedule of list prices. The catalog is printed in two colors and has been arranged for easy selection of the correct flux for any individual application.

102—Industrial Heating Engineering

Dravo Corporation, Dravo Building, 300 Penn Avenue, Pittsburgh, Pa., has prepared a booklet entitled, "Portfolio of Outstanding Engineering in Industrial Heating,"—Bulletin 512. This booklet describes the direct-fired warm air method of heating and illustrates many of the great war structures which are heated by this method. These structures include, among others, the 35 acre Bomber Modification Center at Birmingham, Alabama, numerous ordnance depots, tank arsenals, naval warehouses, and the corrugated sheet steel Quonset huts used by the U. S. Armed Forces at advance bases.

A copy of this portfolio is yours upon request. Write for Bulletin 512.

103—Horizontal Hole Punching Units

Wales-Strippit Corporation, 345 Payne Avenue, North Tonawanda, N. Y., announces Catalog H, illustrating and describing the new Wales Type "H" hole punching units, which punch holes in flanges, angles, container side and similar shaped and formed work without making expensive, built-up, single purpose, cam action dies.

Punching holes in the side of the work instead of on top of a flat surface is made possible by designing these units so the punches move back and forth horizontally, rather than up and down.

BUILD *Extra Business* THIS SPRING!



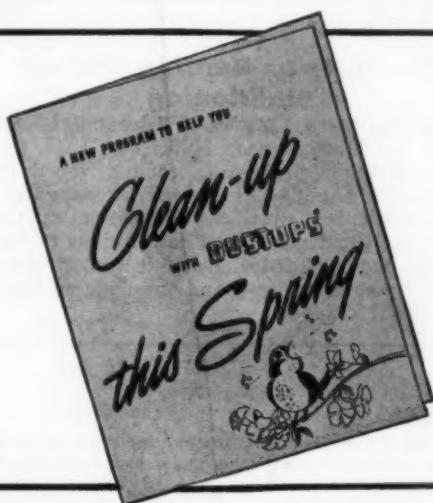
Sell Profitable DUST-STOPS!

Original equipment in most *forced-warm-air* furnaces, *Dust-Stop* Air Filters can boost your sales this Spring—also give you a “sweet” *extra profit*. Spring House Cleaning Time in the home is another logical time to replace dirty air filters. And a lot of this business can be *yours* if you go after it intelligently.



Get More Repair Jobs!

By offering a “Dust-Stop Replacement Service” you can build up your regular “service” business. A Dust-Stop Promotion will bring you new customers, many of whom you can sell furnace-cleaning jobs and repairs. Best of all, you can get this extra business *when you want it*—at the end of the heating season.



Here's Everything You Need!

Free Dealer Helps make it easy for you to sell Dust-Stops, in volume and at a profit. Ask your Dust-Stop Supplier to show you the new Spring Promotion Materials—colorful folders, smart mailing pieces, complete newspaper mats, “spot” radio scripts and a real “stopper” window streamer. All are available, FREE! *Owens-Corning Fiberglas Corporation, 1930 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

DUSTOP

PT. M. REG. U. S. PAT. OFF.

AIR FILTERS

—a FIBERGLAS product

USE
Peerless
Electric
BLOWER ASSEMBLIES
 in your
FURNACES and CABINETS



TWO TYPES
BOTH Peerless Electric

Belt drive assemblies with either top or rear mounted motor—with resilient bases to prevent vibration. Direct drive assemblies use specially-designed Peerless Electric capacitor motors—exceptionally efficient and quiet. Blower wheels, directly connected to motor, are forward curved, dynamically balanced.

ELIMINATE service worries by installing Peerless Electric blowers for winter air conditioning and forced air heating.

Peerless Electric blowers—belt and direct drive types—are designed and engineered from more than 50 years of experience in building quality motors and electrical apparatus. Peerless Electric equipment is complete—manufactured entirely in our own modern plant—not an assembled line—and priced right, offering bigger profits to you.

Write for detailed information.

DIRECT DRIVE

Peerless Electric
AIRBOY PACKAGE UNIT

Delivers 850 cfm, sufficient for a house of approximately 10,000 cu. ft.; 3-speed motor with motor blower unit rubber cushioned. Blower wheel dynamically and statically balanced; a very compact unit. The two motor bearings are the *only* bearings in the unit.

THE Peerless ELECTRIC COMPANY
 WARREN, OHIO
 Established 1893

New Literature

For your convenience in obtaining copies of new literature use the coupon on this page.

104—Three-Phase Resistance Welding

Sciaky Bros., 4915 W. 67th St., Chicago 38, is distributing Bulletin 204-A—8 pages, 8½ x 11—with a description of the Sciaky "Three Phase to Single Phase" system for welding heavy gauges, based on material from the October 9, 1944, issue of STEEL, by G. W. Birdsall.

105—Brochure of Facilities

Schaefer Brush Manufacturing Company, 1025 S. 2nd St., Milwaukee 4, has in process of compilation a brochure of the facilities and illustrations of the great care used in the Schaefer plant in the designing of standard and special brushes.

106—Vacuum Cleaning

Doyle Vacuum Cleaner Co., Grand Rapids 7, Mich., is distributing a folder—Doyle Form No. 108—covering Doyle Industrial and Commercial Vacuum Cleaning. Three models are covered—the Heavy-Duty, the Quiet Zone and the Hercules. Specifications are given for all three models, and a list and illustrations of the attachments.

107—Blower Filter Units

The Brundage Company, Kalamazoo, Michigan, is distributing a 4-page folder, with helps for Brundage distributors. The inside facing pages give furnace blower priority regulations in effect November 10, 1944, and tell how preference ratings may be obtained and extended under the above regulations.

108—Single Wing Tangent Bender

Struthers Wells Corporation, Titusville, Pa., is distributing Bulletin 57-T, covering their new single wing tangent bender, built in three sizes—No. 3 for bending sheets 36 in.; No. 7 for sheets 84 in.; and No. 10 for sheets 120 in. width, all by any length. Typical examples of the bends that can be produced are shown, as well as a diagram of the machine in operation.

109—Postwar Heating and Air Conditioning

The Trane Company, LaCrosse, Wisconsin, is distributing Bulletin No. PB290, dated November, 1944, 84 pages and cover, covering their heating, cooling, ventilating, air conditioning, air handling, and heat exchanging equipment for domestic, industrial and commercial applications.

Following the illustrations and descriptions of the products are two pages of information to aid in the proper selection of Trane equipment, and one page on Trane educational material available.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
 Chicago 2, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

1	2	3	4	5	6	7	8	9
100	101	102	103	104	105	106	107	108
109								

Name _____
 Company _____
 Address _____

Are you Manufacturer—Jobber—Dealer _____



THINKING OF GOING PLACES?

Of course you are! No doubt, right now, you are turning over in your mind the products you want to be handling and selling when the war's end opens up that gigantic building and remodeling market.

When you talk to heating prospects, you will discover they *know* Bryant. Not only because of a reputation for dependability built through more than a quarter-century, either ... but also because the famed Bryant pup *today*, in national magazines, is reminding them how Bryant equip-

ment will live up to their expectations of improved postwar heating.

There will be new things for you to sell in the Bryant postwar line ... new units that will widen your market as well as the eyes of your prospects. They will be *practical*, too, pretested in actual service.

Make a place for modern gas heating in your postwar plans. Let Bryant advertising pave your way. Then, *go places* with Bryant gas heating!

THE BRYANT HEATER CO., CLEVELAND, OHIO
One of the Dresser Industries

LET THE PUP BE FURNACE MAN

bryant
GAS
HEATING



With the Manufacturers

Badger Changes Sales Policy

Badger Corporation, Milwaukee, Wis., manufacturers of permanent filters, has announced a change in their sales policy. Ed Berge, president of Badger Corporation, states that sectional sales agents are now being appointed to represent the complete "Badger" line of permanent filters for home, commercial and industrial air conditioning and heating systems; grease filters for kitchens and galleys; filters and weatherhoods for all makes of welders; humidifiers; filter holding frames, etc.

DeVilbiss Spray Painting School

Four one-week classes will be held for industrial finishers in the first-half of the 1945 School of Spray Painting to be conducted by The DeVilbiss Company, Toledo 1, Ohio. Sessions starting January 15th, March 12th, April 16th, and June 18th, each including the same classroom instruction and shop work, will be open to all regular users of DeVilbiss Spray Painting Equipment.

Chrysler Buys Stokol Business

The Airtemp Division of Chrysler Corporation has purchased certain assets of the Stokol Division of the Schwitter-Cummins Company at Indianapolis, Indiana, and will use its machinery, tools and inventory for the production of Stokol stokers and other equipment. Included in the negotiations was acquisition of all Stokol patents and trademarks, and a two-year lease on the Stokol plant.

The new company has been named Stokol Stoker Company, Inc., and will continue to merchandise Stokol stokers. J. A. McDaniel, sales manager for the Stokol Division, has been appointed vice-president and general manager.

Distribute Duo-Therm Internationally

Duo-Therm oil heating appliances, made by the Duo-Therm Division of the Motor Wheel Corporation, of Lansing, Michigan, will be handled in almost all countries abroad by RCA Victor distributors and subsidiary companies under a postwar agreement jointly announced by M. F. Cotes, vice president of the Duo-Therm organization, and Jay D. Cook, managing director of the International Department, RCA Victor Division of Radio Corporation of America.

RCA Victor distributors and dealers throughout the world have indicated a growing demand for automatic oil heating appliances—furnaces, hot water heaters and space heaters for homes, and other applications such as business premises and offices.

Portable Products Acquires Tag

The C. J. Tagliabue Mfg. Co., Park & Nostrand Avenues, Brooklyn 5, New York, pioneers in the manufacture of Industrial Control and Laboratory Instruments, has sold its assets, including goodwill, name and patents, to the Portable Products Corporation of Pittsburgh.

The progressive research and development policies in electronic and mechanical instrumentation which for so many years have characterized the Tagliabue organization will be continued vigorously under the local management and personnel that has made Tag an outstanding name in industry.

The business will be operated as a separate division of the Portable Products Corporation. Among the interests of the latter are manufacturing plants in Newburgh, N. Y., Philadelphia and Pittsburgh, Pa.

George C. Joslin, sales manager for Tanner & Company, has joined the W. P. Whittington Pump Company, Indianapolis, after thirty years in the sheet metal business.



An **AIRThERM** Direct Fired
Unit Heater Will Reduce
Your Heating Costs . . .

Airtherm Direct Fired Unit Heaters are designed for efficient, controlled heat which reflects a saving in your fuel costs. They can be installed in just a few hours without costly duct work, radiators, or pipes. They can be operated only when heat is needed without danger of freezing pipes, thus eliminating costly stand-by operation.

Airtherm Direct Fired Unit Heaters are built in standard sizes, with capacities from 300,000 to 1,500,000 BTU's.

Let us show you how we can reduce your heating costs. Send us your specifications or write for complete bulletin today.

AIRThERM
MANUFACTURING COMPANY

706 South Spring Avenue • St. Louis 10, Missouri

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Anaconda Through-Wall Flashing installed in Brighton School, Rochester, N. Y. Contractor William H. Long; Architect Charles Carpenter, Rochester, N. Y.

Anaconda Through-Wall Flashing

Anaconda Through-Wall Flashing is efficient, positive and durable. Relatively inexpensive, it is adaptable to practically every masonry condition.

1. The 7/32" high zig-zag corrugations provide complete bond in the mortar in all lateral directions.
2. The integral dam throughout its length is the full height of the corrugations. Flashing will drain itself dry on a level bed—thus reducing to a minimum the possibility of wet walls and heaving by frost.
3. The flat selvage permits ready assembly with counter-flashing or other adjacent sheet metal.

4. Flashing can be locked endwise and a watertight joint secured by nesting one or two corrugations.

5. Due to the design of the dam, flashing can be set within $\frac{1}{4}$ " of the face of the wall and still provide sufficient bed for pointing of the mortar joint. Thus the flashing protects more of the wall than is possible with flashing types having turned-back dams.

Although not available today, Anaconda Through-Wall Flashing should be on your list of postwar construction necessities. Send for Publication C-28 or refer to Sweet's Catalog.

WAR BONDS... Buy more bonds and have a bigger part in victory



Anaconda Copper

THE AMERICAN BRASS COMPANY—General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.



H&C No. 130—THE Baseboard Register for Gravity or conversion. Best service will be given on the four sizes recommended by the National Warm Air Heating and Air Conditioning Ass'n; No. 132½ ML-10 x 8 for 8" pipe; No. 132½ ML-12 x 8 for 9" pipe; No. 133½ ML-12 x 9 for 10" pipe! No. 135½ ML-13 x 11 for 12" pipe.

To Get the Best Registers In the Shortest Possible Time

ORDER IN CONFORMITY WITH THE H&C STANDARDIZATION PROGRAM

The H&C simplified line for war and postwar times, as shown in Bulletin S-95 of January 1, 1945, has been set up for your benefit. It includes all essential items, and by ordering strictly in conformity with Bulletin S-95 you will assure yourself the best registers in the shortest possible time.

Notwithstanding the present great manufacturing difficulties, the quality of all H&C items remains "top-notch"; for we are pledged as always, to make the best registers known to the trade.

Items now being manufactured: Gravity Nos. 210, 265, 130, 330, 345, 623, 653 and 550. A.C. Designs 74, 75 and 88. Also complete accessory line. See catalog 42 and Bulletin S-95 for details. Ask your jobber or write us for Bulletin S-95 if you do not have a copy.



HART & COOLEY MANUFACTURING CO.
World's Largest Manufacturers of
Registers, Grilles, Furnace Accessories
HOLLAND • MICHIGAN

With the Manufacturers

Famous Furnace Annual Banquet

The annual banquet of the Famous Furnace Co., of Cleveland, Ohio, manufacturers and jobbers of sheet metal, furnaces, and roofing supplies, was held on Saturday, December 16, 1944 in the Cypress Room of the Hotel Hollenden in Cleveland.

For the 7th consecutive year, bonuses were distributed



to the employees by Hyman Blaushild, president of the concern. As is Mr. Blaushild's policy, he once again generously remembered each of his former employees, now in the United States Armed Forces with a bonus check equivalent to their 1943 bonuses.

The employees remembered Mr. Blaushild for his many kindnesses, with a 14-caret solid gold pen and pencil set.

Perfex Installs Retirement Plan

Julius K. Luthe, President of Perfex Corporation, 500 West Oklahoma Avenue, Milwaukee, Wisconsin, announces that the directors of Perfex have approved a profit sharing plan, designed to provide its employees with retirement benefits at age sixty-five. All benefits are in addition to those provided by the Federal Social Security program.

The plan requires no contributions from any employee. Each year Perfex will contribute twenty percent of its profits, after allowance for a predetermined return on the company's net worth. The corporation's estimated contribution for this year will amount to \$80,000.00.

Every regular, full time employee, who has completed four years in the continuous employ of the corporation and who has attained the age of thirty will participate in the plan in accordance with a uniform formula based upon the employee's earnings for the year and the number of years in the employ of the company.

Participants who leave Perfex prior to retirement will receive, according to a formula, a portion or all of the amounts allocated to them. The plan also provides total disability and death benefits for each participating employee.

Sampsell Time Control Promotions

Sampsell Time Control, Inc., Spring Valley, Illinois—A. V. Sampsell, president and J. I. Zook, vice president and general manager—announces organizational advancements and promotions for nine members, effective December 22, and made necessary by rapid expansion and increased responsibilities of various departments.

These most recent changes in the company personnel are:

A. S. Webeck has been appointed assistant general manager. His duties will be administrative as assistant to J. I. Zook, vice-president and general manager.

R. L. Gray has been appointed head of the production planning department.

J. G. Eldridge has been appointed research engineer.

O. W. Dobson has been appointed general manager of trade sales, with J. P. Doyle, assistant sales manager.

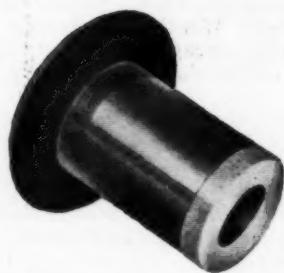
Fred Stahr has been appointed master mechanic and chief adviser on war and civilian tooling.

Ray Stage has been appointed superintendent of the machine department on war and civilian production.

Dom Marchando has been appointed superintendent of motor and relay departments.

Elinda Kohl has been appointed welfare supervisor.

Doyle Gudgel will supervise receiving and shipping as well as traffic.

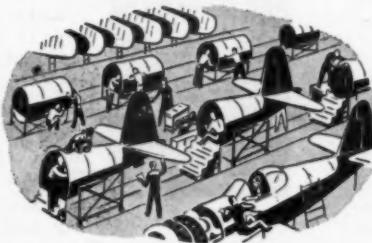


Got a riveting job in a hard-to-get-at spot?

Widely used by aircraft manufacturers . . .

Du Pont Explosive Rivets aren't new. In the past three years many millions of them have been used in building Uncle Sam's powerful air fleet.

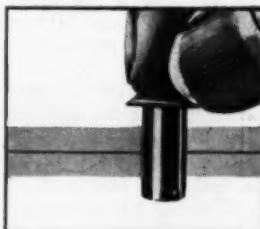
They've helped speed construction . . . cut costs. They've solved the problem of riveting in awkward, hard-to-get-at places. And day-by-day new time and money-saving applications are being found for them.



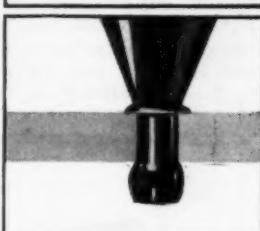
EXPLOSIVE RIVETS ARE EASILY INSTALLED

Just two
simple steps:

1. Insert Explosive Rivet
in the hole.



2. Apply tip of heated Du Pont Riveting Iron to Rivet head.



In 1½ to 2½ seconds the Rivet is set and a strong, tight joint is formed. No after operation is required to give the head of the Rivet a finished appearance. It's a one-man job from start to finish.

IF YOU HAVE A POST-WAR RIVETING JOB . . .

Whether you expect to fabricate bus or passenger car bodies, radio or refrigerator cabinets, air conditioning ducts, heating and ventilating equipment, household appliances or any riveted commodity . . . consider Explosive Rivets. They may help you do the job better, easier, quicker . . . and at lower cost.



DU PONT EXPLOSIVE RIVETS

The only one-piece blind fastener



Send for this useful Manual TODAY!

- Contains complete information
- shows typical applications
- explains how to select and use these modern, one-piece blind fasteners.

E. I. du Pont de Nemours & Co. (Inc.)
Explosives Department
Wilmington, Delaware

Please send a copy of "High Speed Blind Riveting with Du Pont Explosive Rivets."

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

With the Manufacturers

C. G. Hussey and Company, a division of the Copper Range Company, has announced the appointment of A. H. Krut as Director of Sales, with headquarters at Pittsburgh, Pa.

Edward Abrams has been appointed New York District Sales Manager, with headquarters at 140 Sixth Avenue, New York City.

Obituary

Dale Randolph Bard, 59, secretary-treasurer and founder of the Bard Manufacturing Co., warm air furnace producers, died December 31st at his home in Bryan, Ohio. Surviving are his wife, two sons, a brother and sister.

Howard Teel Brinton, Assistant Manager of Sales for the Wheeling Corrugating Company, passed away January twenty-eighth, in the Emergency Hospital, Washington, D. C., after a short illness.

Mr. Brinton was loaned to the Government, where for the past year he has been serving in the Steel Division of the War Production Board, with offices in Washington, D. C. He is survived by his widow, Katherine Fisher Brinton, one son, Howard T. Brinton, Jr., of Silver Spring, Md., and his mother.

Parker-Kalon Corporation, 200 Varick Street, New York, announces with profound sorrow the death on December 19, 1944, of Charles S. Trott, Assistant Treasurer and Sales Manager. His passing, at the untimely age of 45, is felt with poignant loss by our organization.

Charley was connected with this Company and its predecessors for the past 29 years. He directed the sales and advertising departments for the past 22 years. He was intimately familiar with all the problems of the trade and industry and contributed importantly to their solution.—L. Goldburg, General Manager.

Herman C. Dreis of Dreis & Krump Manufacturing Co., manufacturers of Sheet Metal Working Machinery, 74th Street and Loomis Boulevard, Chicago 36, died at the age of 81 in his Santa Cruz, California, home January 19th, 1945.

Mr. Dreis has not been active in the business of the company for the past twenty-five years. He was known throughout the country both as a sheet metal worker and the originator and manufacturer of the Chicago Steel Hand Bending Brake. He was originally a foreman sheet metal worker in charge on many of the large sheet metal jobs during the eighteen-nineties.

In 1898 he decided to go into the sheet metal business for himself. He was not satisfied with the bending brakes then on the market and determined to make a better one for himself. After he had the first brake finished another of his associates wanted the same machine and that is how he started into the manufacture of what is now universally known as the Chicago Steel Bending Brake.



John W. Pauling

He is survived by his widow, Loretta Pauling, and two sons, Stanley and William, both in the Army.

The body was sent to Minneapolis for burial from his home at 2615 Park Avenue, Minneapolis.

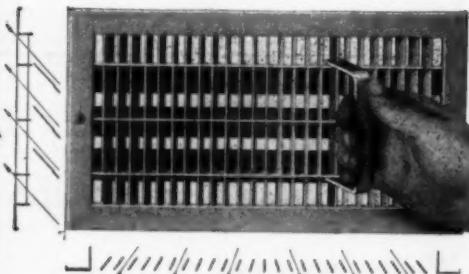
John W. Pauling, 55, of Minneapolis, vice-president of the Minneapolis-Honeywell Regulator Company, who was widely known in the housing and heating industry, died suddenly January 17 while in Chicago on business. He suffered a heart attack and was pronounced dead at Wesley Memorial Hospital.

Mr. Pauling was born in Blackburn, Missouri, and came to Minneapolis-Honeywell as a salesman in 1923, after operating his own business in the heating field in St. Louis.



NO. 32

INDEPENDENT
"Fabrikated"
REGISTERS • GRILLES
COLD AIR FACES



NO. 321A

ALWAYS LEADING—ALWAYS PROGRESSING



Only products of proved dependability can attain leadership. The quality of INDEPENDENT "FABRIKATED" Grilles and Cold Air Faces is backed by 46 years of manufacturing experience in the register field.

Join the parade to greater post-Victory profits by concentrating on the extensive INDEPENDENT line to meet all requirements for air conditioning and warm air heating registers, cold air faces and grilles—all from one source of proved dependability.

No. 32, illustrated, is a "Fabrikated" register with

multiple valves for use in the floor in furnace installations.

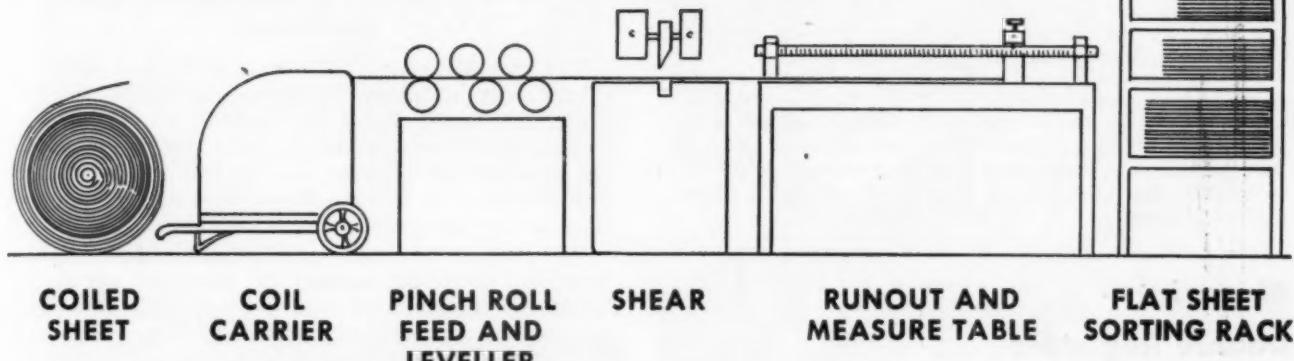
No. 321A wall grille with deflecting vanes is a directed air flow "Fabrikated" grille with bars that can be adjusted individually to direct air flow to the right, left or fanwise, as illustrated. Horizontal deflecting vanes in back may be individually adjusted to give upward or downward deflection of air flow.

Send for catalog showing the wide variety of the complete INDEPENDENT line with many improved exclusive features.

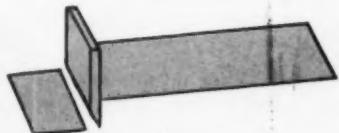
THE INDEPENDENT REGISTER CO.

3747 EAST 93RD STREET, CLEVELAND, OHIO

MODERN SHEET HANDLING *Like this*



Saves This Waste



If

you will send us a sketch of the floor plan of your shop with location, size and type of present installations indicated, our engineers will prepare a simple design showing you how the Yoder Coiled Sheet Line should be fitted into an efficient, modern, time and cost saving layout . . . Address attention of Sheet Metal Engineer.

THE new and better way for sheet metal shops, jobbers, and contractors to handle stock is in coiled sheet, with the simple YODER handling equipment illustrated in the schematic drawing above.

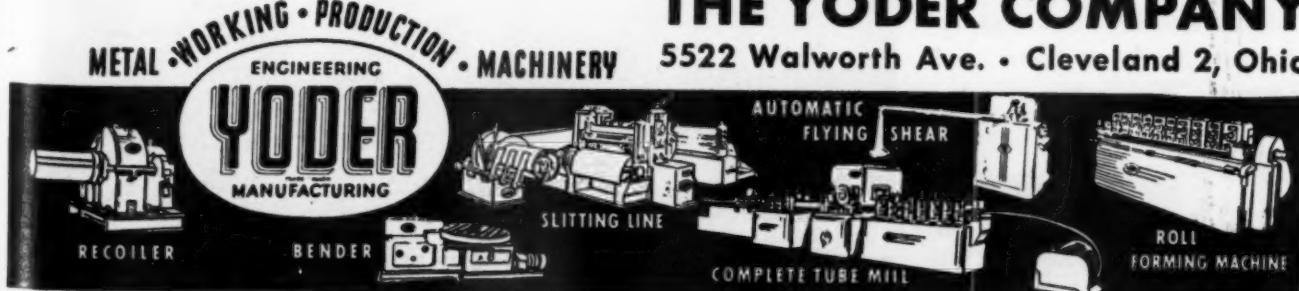
It saves storage space. Saves time over handling estimated varieties of widths, lengths and gauges. Above all, it eliminates that profit-cutting waste of end pieces, by making it possible to cut every sheet to exactly the length wanted.

Mills have developed such vast facilities and improved methods for producing high quality cold rolled and coated sheet in coils that the reasons for jobbers and large shops handling their stocks in this form are now obvious . . . high quality sheet . . . fine coatings . . . unheard of low costs and substantial savings in fabrication. Your required widths and gauges can be conveniently stored in large quantity, and any variety of lengths cut without waste as needed.

The YODER equipment is so designed that if you now have satisfactory shear equipment, the rest of these units can be adapted to what you have. Prices will be within the reach of contractors, jobbers and large shops.

Write now for more details.

THE YODER COMPANY
5522 Walworth Ave. • Cleveland 2, Ohio



Vorys Brothers School

Vorys Brothers, Inc., 79 E. Goodale Street, Columbus, Ohio—distributors of sheet metal, tinnery and roofers supplies—are holding a warm air heating school on March 2, 1945 at 6:00 p. m. sharp, at the Seneca Hotel Ballroom, 361 East Broad Street, Columbus, for the good of their customers.

This school will be a concentrated short course in one long evening to acquaint dealers with the latest engineering information on forced warm air heating.

There is a new way to figure heat loss, size pipes, etc., developed by the National Warm Air Heating and Air Conditioning Association—accurate and fast.

The instruction, dinner and school equipment will be provided by Vorys Brothers, Inc. Dinner will be at 6 p. m. sharp to get an early start and dealers are asked to make reservations at once. Those who can not come in time for dinner are requested to make reservations for the school starting promptly at 6:45 p. m.—Newt T. Hess, Market Manager.

Blueprint —

Double Registers

(Continued from page 74)

mostat. This action applies whether heating or cooling is called for. A safety device shall be incorporated in the wiring hookup so that only heating or cooling action can be relayed back to the generating units at any one time. No conflict of this nature would ordinarily occur, but the safety should be installed in case someone should inadvertently move one of the ther-

mostat settings in error. For ventilation or air circulation only, the zone dampers would automatically assume an open position. The zone dampers would be similar in operation to the M-H Moduflow equipment. They will assume a wide open position with a falling temperature for heating and the reverse for cooling. As the room temperature starts to rise during the heating cycle, the damper begins to close, with the reverse operation for the cooling cycle. Fig. 1 shows a schematic outline of such an arrangement.

Conclusions

The proposed plan just covered omits any reference to radically different developments which may be brought out as a result of this war activity. It also omits certain features which have been proposed for air conditioning systems in the past but which fall into the category of refinements or questionable additions to the basic needs and principles of good design.

The reasons for such omissions are simple. Having developed a sound method of practical application based on fundamental and proved basic laws, any glorification of such equipment by the addition of "gadgets" merely adds possible trouble and breakdown points with little else to offset these potential headaches. Thus, an automatic pilot lighter, an ozonator, a dehumidifier, etc., have been purposely omitted from this proposed ideal system of practical air conditioning. Only those features which are fundamentally necessary have been included. The development of the photo-electric eye, radar, etc., will undoubtedly make for improvements in the sensitivity and operation of the various controls, but the basic principles of air distribution cannot be changed much.



Wherever sheet metal is being sheared or formed, Niagara Power Squaring Shears and other machines are giving more production per hour.

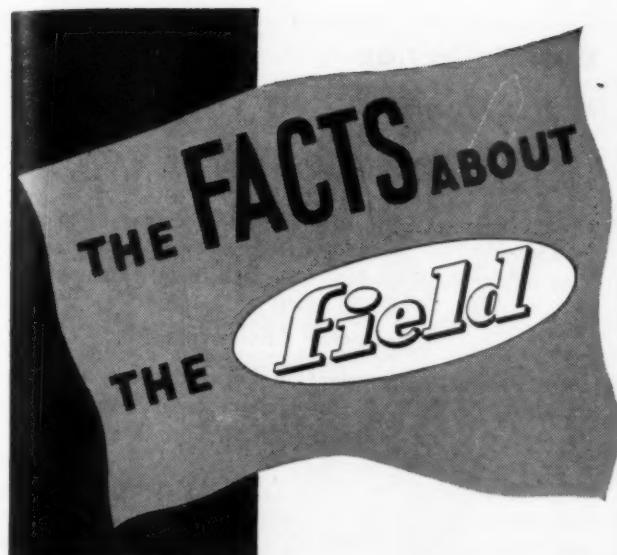
In addition to speeding up production, they are also helping to keep wheels turning and planes flying by doing the many jobs essential to maintenance and repair.

The Series No. 3 Shear illustrated at right is just one of the many modern Niagara machines which are doing important work quicker and better.

• • •

Niagara Machine & Tool Works, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.

BUY UNITED STATES WAR BONDS



**GATE BALANCED
AT FACTORY**

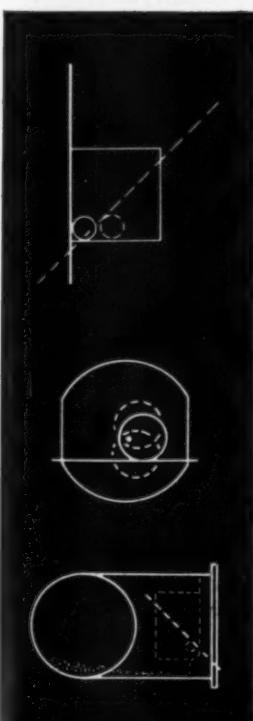
**DOESN'T CLOG
OR WARP**

**QUICKLY
RESPONSIVE**

**MADE OF HEAVY
MATERIAL**

**ROLLING TYPE
HINGE PIN**

**FREE SMOKE
PASSAGE**



ROCKER TYPE FULCRUM

This design — the action of the old rocking chair — means less friction. Less friction means greater accuracy, greater sensitivity, no binding, no oiling, nor corrosion and years of trouble free operation. The hinge pin rolls in slots, instead of twisting in journals.

OFF CENTER GATE MOUNTING

This mounting — coupled with side wings — provides greater sensitivity and greater accuracy. Barometric pressure operates on a greater effective area; the side wings increase the air opening more uniformly, more accurately compensating for each barometric change.

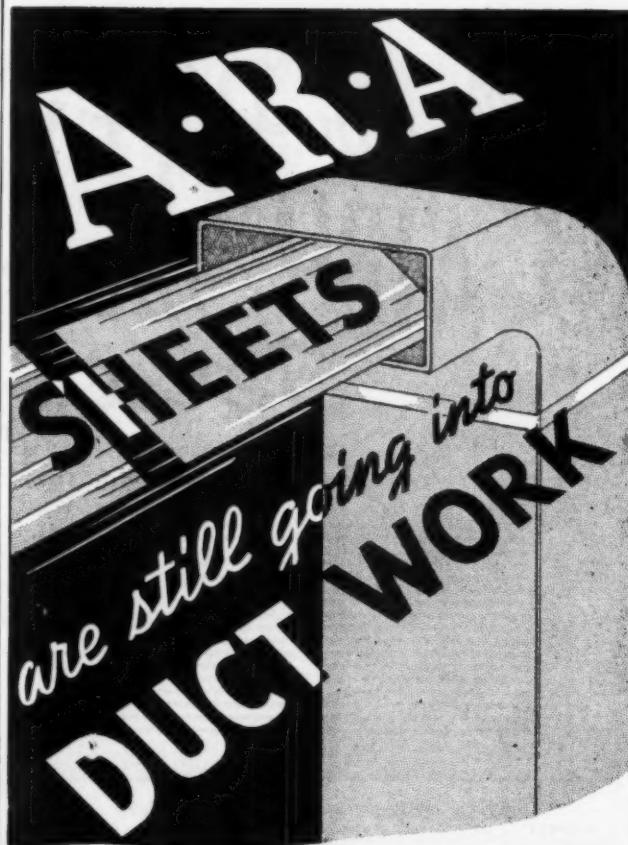
EXTENDED HOUSING

This design places the gate — even in wide open position — outside the flow of gases from the heating unit. Thus the Field Control is not readily fouled by soot, nor will the gate warp from heat. This means longer operating life — no service calls — uniform regulation.

Field

CONTROL DIVISION

OF H. D. CONKEY & COMPANY, MENDOTA, ILLINOIS



Plan your Duct-work and go ahead with it! You can be sure of getting A-R-A Sheets when you want them and in any quantity. **DON'T PASS UP BUSINESS! KEEP YOUR JOBS ON SCHEDULE!**

Asbestos clad A-R-A Sheets are tough yet flexible—rigid but not brittle—fire-proofed and moisture-proofed—will not dry out, crack, crumble or chip. A-R-A Sheets have a high insulating value (K. .45 B.T.U.)—good sound deadening properties—and they deaden metallic rattle.



CARTON CONTENTS

20 Sheets 33" x 48" Per Carton
40 Sheets 16½" x 48" Per Carton

SHIPPING WEIGHT
Approximately 100 lbs. per
Carton

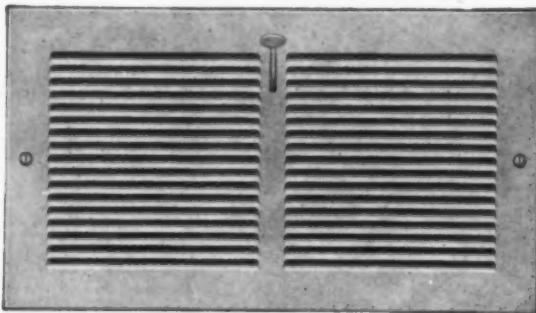
SHEET THICKNESS
Approximately 3/16" thick

You can now get Genuine
A-R-A Sheets from Your Jobber

Write today for the free 16-page
Illustrated booklet No. 89-A

GRANT WILSON, INC.
141 WEST JACKSON BLVD., CHICAGO 4, ILLINOIS

An Ever Popular Design the AIRO-FLEX "7000" Series



THIS model is a simple, sturdy, moderate priced register suitable for most forced air heating jobs. Modern and pleasing in appearance, it has single louvre and bendable fins, set when delivered at about 22° downward. Furnished for wall and baseboard registers and intakes. It's an efficient, easily installed register, which does not run up the cost where the job must be kept within limits.

Auer offers a complete line of floor, base, and wall registers and return faces, for gravity or air conditioning systems—including all air directional types. We also make flat metal grilles for all purposes where grille panels are needed.

Ask for Auer Register Book—
or special Grille Catalog "G"

THE AUER REGISTER COMPANY
3608 Payne Avenue Cleveland 14, O.

AUER REGISTERS & GRILLES

For Air Conditioning and Gravity

Dust Collection In the Foundry

(Continued from page 87)

also allow certain quantities of much coarser material to escape. The temperature limits indicated assume that no form of heat exchanger is used in the system.

Collector Efficiencies

Outlet dust concentrations of collectors shown as styles A, B, E, F, G and H have been determined by the writer using the impinger method. The efficiencies were then calculated based on the above conditions. The values given in Table 1 for the remaining collectors were obtained from reported tests made elsewhere and from such information as was available. Installation costs are based on average conditions. Due to the wide variations in foundry conditions all of these values should be used only for comparative purposes.

Centrifugal Collectors

Examination of the characteristics of centrifugal collectors A and B of Table 1 will readily show that these styles are only suited to coarse material, and are not able to collect, with any high degree of efficiency, fine foundry dust. Their usual application is in sand conditioning, exhausting tumbling barrels, etc., rather than preventing pollution of the atmosphere. These general types are familiar to foundrymen. (Fig. 3, A and B.)

Style C, Table 1, indicates reported characteristics of a centrifugal cone collector which consists of a number of small centrifugal cones connected as a unit. (Fig. 3 C.)

Styles D and E, Table 1 (Fig. 3, D and E), show the more efficient styles of centrifugal collectors. The double scroll types, shown as style E, is one of the most efficient of the centrifugal collectors from the standpoint of collection of the finer particles. The skimmer type collector is shown as style D (Fig. 3 D), which has a relatively high efficiency in collecting fine particles.

The characteristics of the fan type centrifugal collector are given as style F, Table 1. It is a combination fan and centrifugal collector driven by an electric motor. (Fig. 3 F.)

Limitations of "Cyclones"

If the dust concentration is high, and the percentage of fine particles is high, with a relatively low specific gravity dust, these types of collectors can not be depended upon to solve a dust nuisance. When 50 per cent or more of a dust passes through a 325 mesh screen these types of collectors are apt to release into the atmosphere objectionable amounts of dust. This is particularly true when a large proportion of these fine particles is clay or other binding materials of impalpable character. However, on dusts having high specific gravity such as pure silica sand, this type of machine can be efficient in the collection of extremely fine particles.

[Part 2 will follow]



SQUARING SHEARS

**TOUGH...FOR THE STEADY GRIND
... ACCURATE CONTROL**

Fabrication of Sheet Metal requires Machinery and Tools of rugged construction, yet they must be responsive to control to insure accurate production.

That the PEXTO line features these characteristics, plus power in reserve, is evidenced by its wide acceptance throughout the industry.



COMBINATION ELECTRIC ROTARY MACHINE

THE PECK, STOW & WILCOX COMPANY, SOUTHBURY, SOUTHBURY, CONNECTICUT, U. S. A.

Payne ZONEAIR

PRE-WAR PERFORMANCE ASSURES
POST-WAR PREFERENCE—COAST TO COAST

Building load for gas companies, sales for heating dealers... and good will for both... PAYNE gas furnaces have been associated with advanced design and engineering leadership for 30 years. ★ Post-war models will be improved, of course... but gradually, soundly, and only after exhaustive tests. And they will be ideally adapted to...

Payne
ZONE-CONDITIONING

...a progressive development of the time-tried PAYNE "Unit" heating system: Winter air-conditioning and cooling summer ventilation, controlled by zones or rooms. Write for new ZONE-CONDITIONING booklet.



PAYNEHEAT

30 YEARS OF LEADERSHIP

Payne FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

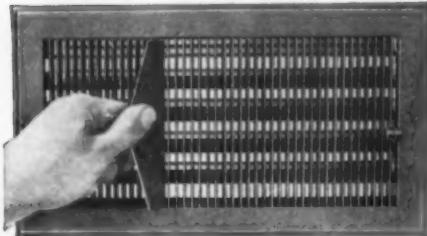


**SUPPORT THE
STANDARDIZATION
PLAN
WITH**



**No. 40 Series
Gravity Baseboard Registers**

No. 40 Series Gravity Baseboard Registers.. Easily adjusted grille bars, non-vision interior, two-piece construction with center attachment buttons. Sidewall in-takes to match.



**No. 256
4-WAY FLOW
A-C
REGISTERS**

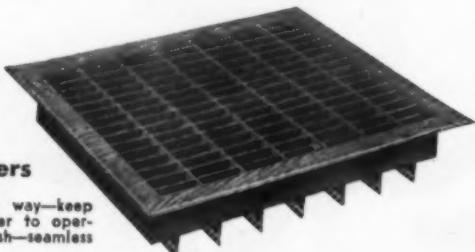


DEFINITELY COMPLY with National Warm Air and Air-Conditioning Ass'n specifications—give you complete range of directional flows.

No. 400

**TRUSSTEEL
Floor Registers**

Valves run short way—keep walls cleaner—easier to operate—steel proof mesh—seamless corners.



The "Standardization Plan" eliminates surplus stocks—increases active working inventory—saves time—avoids delays—completes contracts on schedule. Send for latest catalogs.

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY

**Zideck-Press
Brake Work**

(Continued from page 83)

tween two strips of 3/16 inch narrower strips, this end to fasten into the ram, like any other die, and strike with it in the female "V" die. The stroke will close the flaring out sides. If at all necessary, we can use the flat dies to complete the closing. Then the touching edges of the metal are welded and abrasively finished, resulting in the finished part of Fig. 13. Again, in heavy production, special dies can be used to make this part more quickly and smoothly with less effort. This part can also be manufactured with the process reversed; the radial is formed in the middle of the strip of metal, with the stroke of the die bringing up the ends into a vertical position, and by the use of the smaller radius male die the ends will close uniformly enough to permit completing the closing in flat dies.

In Fig. 14 is shown a formation which, for its completion, requires a so-called "offset die." Only the male half need be offset. It operates in the standard 90-degree female die. The first turn, nearest to the edge of the metal, is completed to 90 degrees first. Then the second turn is started to 50 or more degrees in the "V" die-set. And we use the "offset die" to complete the turn to the required 90 degrees.

The more complicated formatures are simply that many more successive operations. In the next installment we shall deal with the mechanism of the Press Brake and its manipulation.

Amendments

Interpretations

(Continued from page 51)

ceiling prices prevailing in the industry generally and, particularly, its relation to prices established for alternative sources of supply;

(b) The extent to which purchasers for resale or commercial and industrial buyers will absorb any increase that may be granted the manufacturer; and

(c) Applicant's current rate of production as compared with his rate of production during normal pre-war years.

The relief to be granted under Order B-1 will not exceed:

(1) Manufacturing cost (plus packing cost and shipping cost where delivered prices are quoted or freight is allowed or equalized) where applicant's current over-all net profits before taxes are favorable as compared with his 1936-1939 average annual net profits before taxes.

(2) Total cost where applicant's current over-all net profits before taxes are normal as compared with his 1936-1939 average annual net profits before taxes.

(3) Total cost plus a normal net profit on the product or line where applicant's current over-all net profits before taxes are unfavorable as compared with his 1936-1939 average annual over-all net profits before taxes.

The actual amount of increase granted, however, may be less than the maximum amounts described, OPA pointed out.

If you are developing new post-war fans, blowers, or other air conditioning equipment—it will pay you to investigate

TRIANGLE BEARINGS

Shock-Absorbing Pillow Blocks

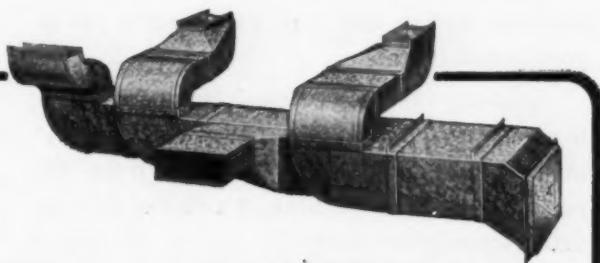
They are silent—vibrationless—self-lubricated—scientifically streamlined for compactness, simplicity, strength and minimum obstruction to air flow.

Write for samples and complete information

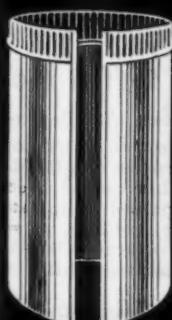
TRIANGLE MANUFACTURING CO.
392 DIVISION STREET OSHKOSH, WISCONSIN

CHAR-GALE

Because they're already engineered to save you time and trouble, you can make extra profits with Char-Gale "Pre-fabricated" Ducts and Fittings. Made by standard mass production methods . . . all sizes are accurate . . . no delays on the job. Try us on your next installation.

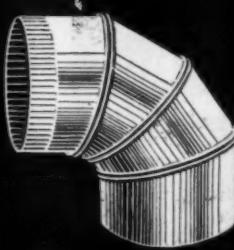


Pre-Fabricated DUCTS and FITTINGS



SMOKE PIPE

Backed by years of experience, the Char-Gale double offset lock gives continuous satisfaction.



ELBOWS

Easy to adjust . . . extra large segments . . . won't come apart. Char-Gale elbows are trustworthy.

PRE-FABRICATED AIR DUCTS

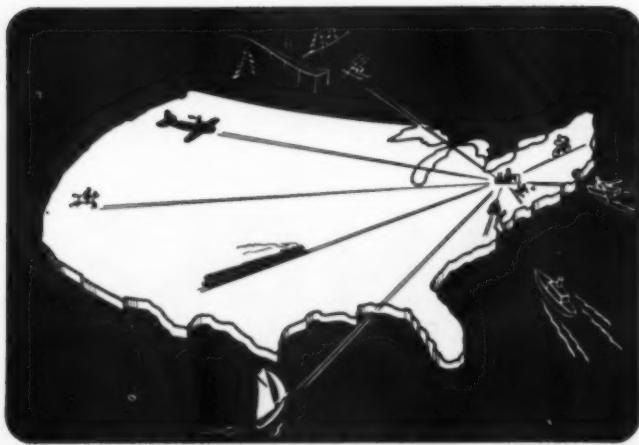
The "quick-method" chart in the Char-Gale catalog gives accurate sizes for any job and figures costs for you. Send for it.



CHAR-GALE
MANUFACTURING CO.

CATALOG NO. 40

For complete information on smoke and stove pipe, elbows, warm and cold air pipe, registers and air filters write CHAR-GALE Mfg. Co., 3125 Hiawatha Ave., Minneapolis 6, Minn.



we never knew we had so many friends

Orders for Reznor Heaters keep rolling in from all parts of the country.

Deliveries still haunt us because of delayed shipments of motors and other materials, man power limitations, and priorities.

But we appreciate your interest in Reznor products, and we only hope we can serve you to your satisfaction.

In many cases, it is impossible to give delivery date upon receipt of order. However, the information is furnished just as quickly as it is possible for us to schedule a reliable delivery date. Nevertheless, most of our orders are being shipped "as promised."



Your co-operation and continued interest in Reznor Heaters will be appreciated.



REZNOR
MANUFACTURING CO.

REZNOR

402 JAMES STREET
MERCER, PENNA.

"GAS HEATERS EXCLUSIVELY SINCE 1888"

Simultaneously with the issuance of Order B-1, Orders A-2 and A-3 (the previous orders applying to both building materials and consumers' goods) are amended to remove from their coverage all building material commodities.

(Order B-1 Under Maximum Price Regulation 188—Manufacturers' Maximum Prices for Specified Building Materials and Consumers' Goods Other than Apparel—effective February 7, 1945.)

Steel

Painting

(Continued from page 90)

erated-weathering test they were less effective than those in group 1. The primings in groups 3 and 4 were definitely inferior to those in groups 1 and 2.

The rating of any paint coatings on steel is necessarily influenced by the degree of such conditions as chalking, checking, cracking, flaking, scaling, peeling, and rusting. Since the failure of a paint film is usually a gradual deterioration from one condition to another, it is very difficult to designate the transition point at which the film suffers a finite change. It is admitted that some of these ratings might possibly be shifted to a neighboring group, and it is also emphasized that all the primings in any one group are not to be construed as being equal in protective value. However, it is believed that the primings in groups 1 and 2 will last longer and give better protection against corrosion than those in groups 3 and 4 under equal service conditions.

[Part 2 will follow]



The Problem of Cooling Off a Hot-Headed Building... doesn't bother Allen Engineers.

We have yet to find a job where the plant engineer could not tell us the actual heat input used for process in a building suffering with the hot head. Knowing this data, a precise calculation is possible, showing the expected temperature difference that can be maintained in the building, as well as a figure showing the expected velocity of gravity flow due to temperature difference and height between inlets and outlets (commonly called stack effect).

With these figures as a base, it is only necessary to look in a price book and determine whether or not gravity equipment or fan equipment will be the least expensive over a period of time. Allen always follows this sound procedure. We are always ready to talk shop with you. *The Allen Corporation, 9751 Erwin Avenue, Detroit 13, Michigan.*

THE Allen CORPORATION
ENGINEERED VENTILATION FOR INDUSTRY

You Must Get Adequate Gross Profit

(Continued from Page 50)

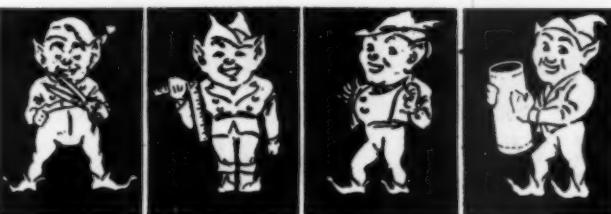
profit of a net of 10 per cent or better as follows:

Selling price, 100 per cent.....	\$300.00
Labor, 12 to 20 per cent.....	45.00
Selling cost, 12 to 15 per cent.....	45.00
Overhead, 5 to 10 per cent.....	30.00
NET PROFIT, 10 per cent.....	30.00

A successful heating contractor said years ago, "If you price each job with an adequate gross profit, then sell enough such jobs and then pay expenses correctly, you will make an adequate net profit. Management is a matter of one job at a time priced right, installed and engineered right, expenses right, and selling enough of such jobs."

In other words, to make a profit, each job should be checked as to all of its elements:

- (1) Make a heating layout of the home.
- (2) Make specification sheet from heating plan so that you charge the customer for equipment and enough fittings necessary.
- (3) Install job from heating plan and specification sheet.
- (4) Keep all papers in a "job envelope" and check your costs against your estimates on the specification sheet to see that you make an adequate profit on each job.
- (5) Break down your costs and profit or loss on



4 Little "Fitting" Guys Fighting For You!

Will cuts installation costs—Willie makes fittings fit—William keeps prices down to bed rock—and Bill sees that there is stock near you.

FLASH NEWS! Complete, simplified line Gravity Pipe and Fittings now available on rated orders.

FREE: Complete, easily understood gravity pipe and fittings catalog showing full simplified line. Write Dept. 2 for prices and catalog.

THE WILLIAMSON HEATER COMPANY
CINCINNATI 2, OHIO

WILLIAMSON
WARM AIR FURNACES



ATH-A-NOR
Furnace Repair Parts

The furnace choice of dealers who know performance and saleability has been Ath-A-Nor for more than 50 years. Quality, economy and efficiency have always distinguished the Ath-A-Nor line. Replace with Ath-A-Nor to insure maximum performance and fuel economy! And continue to pile up scrap for munitions and see that it reaches government agencies speedily!

MAY-FIEBEGER COMPANY
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR
OVER 50 YEARS
NEWARK, OHIO



protects
MASONRY
CHIMNEYS
VITROLINER
-the Superior Vent Pipe

LINE CHIMNEYS for PROFIT!

ATTENTION CONTRACTORS:

Make a profitable business of installing Vitroliner Vent Pipe in old or new masonry chimneys for long life and PROTECTION. Ideal for gas or oil fired jobs where CONDENSATION is an important problem.

VITROLINER CHIMNEY LINER is heavy gauge, high quality enameling stock iron and is coated inside and out with special high temperature acid-resisting vitreous enamel. Bell and Spigot type joint assures a perfect and uniform fit.

Vitroliner Vent Pipe is easy to install in a few hours. Write for details to

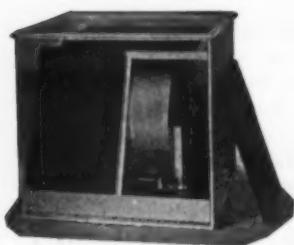
**CONDENSATION ENGINEERING
CORPORATION**

122 S. Michigan Ave. Chicago 3, Illinois

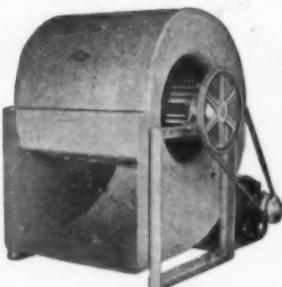
Properaire • AIR MOVING EQUIPMENT

**BLOWERS
EXHAUSTERS
FANS**

**for Homes
Stores
Offices
Factories
Institutions**



SERIES 2000
Insulated Package Units



"B" ASSEMBLY Belt Drive



TYPE E
Direct Drive

Ask your Jobber to write
for "Blower File" FREE

GRAND RAPIDS DIE & TOOL CO.
1202 Godfrey Ave., S. W., Grand Rapids 2, Mich.

Sampsel
AUTOMATIC CONTROLS

Spring is the time that
AUTOMATIC CONTROLS
are needed most!

GET THIS IMPORTANT BUSINESS

Quick temperature changes in Spring make hand-firing an even greater problem. Sell homeowners Sampsel Controls to eliminate heat waste.



Sell Sampsel Package Units

Sampsel Damper-Motor Controls in Package Units are easy to sell. They are complete with Room Thermostat, Damper-Motor with built-in transformer and all accessories. No. 8873 includes Warm Air Limit Control.

Get complete facts. Advertising helps FREE.

Sampsel Time Control, Inc.
SPRING VALLEY, ILLINOIS

Fuel-Saving
Starts With
CONTROL

each job at the end of each month on a recapitulation sheet, so that you may analyze your complete business each month to see that a profit was made on each job. If losses show up, steps can be taken to remedy gross profit or excess expenses on future jobs.

(6) File "job envelope" after job is finished for future reference.

Sell nothing at a loss. Even service should have an adequate gross profit in order to show a net profit.

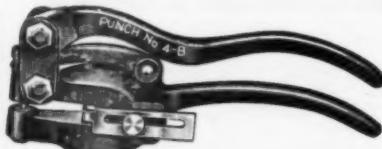
Post War Need for Profit

Especially in post-war months, pricing of jobs will be most important. No one knows what will happen, but if the pattern of the first world war will follow after the present war, costs of materials and labor will rise precipitately. We will have to watch rising costs to make sure we have an adequate gross profit after this war. If we figure gross profit on a percentage basis and pay out expenses on a percentage basis, rising costs will automatically be taken care of and will not throw us for a loss.

The first cardinal principle of any successful heating business is to get an adequate gross profit on a percentage basis, and to pay out expenses on a percentage basis, to make sure that each job made a net profit. Of course, to sell jobs at an adequate gross profit requires more sales effort, but by using more salesmanship you can get jobs that have the right margin of profit.

Adequate gross profit will allow or bring modern merchandising into your heating business. You will make more money, you will put in better jobs, and you will get more satisfaction out of your work. You will be able to hold up your head with any of the merchants in your neighborhood or town.

WHITNEY LEVER PUNCHES



NUMBER
FOUR "B"
PUNCH

This punch for sheet metal work has a capacity of $\frac{1}{4}$ " through 16 gauge. Weight 3 lb. Length 8 $\frac{1}{2}$ ". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.



NUMBER TWO
PUNCH

And here's another handy tool for the modern shop — the No. 2 Punch. Length 23". Capacity 5/16" through $\frac{1}{4}$ " Iron, weight 12 lbs., depth of throat 1-11/16". Punches and dies $\frac{3}{32}$ " to $\frac{1}{2}$ " by 1/64".

W.A.
WITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Essentials of Oil Burner Service

(Continued from page 65)

occasional sparks indicates too much air and will cause carbon deposits in the heating plant.

For first test, adjust air-oil ratio to a point where flame will have a smoky tip. Then increase air slightly and take reading. Increase or decrease air until a satisfactory reading is made.

Causes of Heat Wastage

Excessive draft causes heat losses up the chimney. High stack temperatures usually accompany excessive draft. The heated gases generated by the oil burner combustion should emit this heat before going up the chimney. The heat going up the chimney is lost, helping to cause an oil glutton.

Smoke and soot are caused by a faulty flame.

Combustion noises or roar in the combustion chamber are caused by faulty adjustments.

Carbon, rust, and scale are caused by smoke, soot, and moisture generated by a faulty flame.

An oil glutton is the result of poor adjustments and insufficient inspection and care of your oil burner.

In addition to the foregoing, all controls and limiting devices shall be checked for proper operation.

In order to test controls, one must have a voltmeter and test lights.

Fatigue at times comes to everybody. Some of the

WHITNEY-JENSEN PRODUCTS 30 YEARS EXPERIENCE

NEW LEVER PUNCHES

Made in 7", 10", 18", 24" throat depths. All steel welded frame and sturdy welded steel stand. Powerful geared action. Capacity 7½ tons. Throat height 6", die space 3¼". Standard equipment includes depth and side gauges, punch holder, die adaptors, die shoe and one punch and die. A strong, versatile machine suitable for a wide variety of work.



NO. 455 ANGLE IRON COMBINATION SHEAR-NOTCHER-BENDER

Three standard Whitney-JENSEN units are conveniently positioned on a sturdy welded steel stand—the No. 4 Angle Iron Shear, No. 50 Mitre Notcher, and No. 51 Bender—to form this No. 455 Combination. Capacity 2" x 2" x 1/4" angle iron.



WHITNEY METAL TOOL COMPANY
91 FORBES ST. • ROCKFORD, ILL.

"GENERAL" MULTIBLADE EXHAUSTERS



Forward Curved Blades

A Full Line

Forward
and
Backward
Curved
Blades

All Drive
Arrangements

Surprisingly
Quick
Deliveries

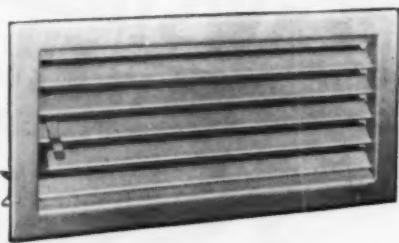
Write for the New "Blue Book"
Bulletin SC-101

GENERAL BLOWER CO.

400 N. Peoria St. Phone Canal 6340
Chicago 22, Ill.

NEW YORK 4, N. Y.
120 LIBERTY ST.
PITTSBURGH 19, PA., FIFTH-GRANT BLDG.
CLEVELAND 7, OHIO
1084 LAKELAND AVE.

PHILADELPHIA 4, PA.
148 NORTH 4TH ST.
DETROIT 2, MICH.
7644 WOODWARD AVE.

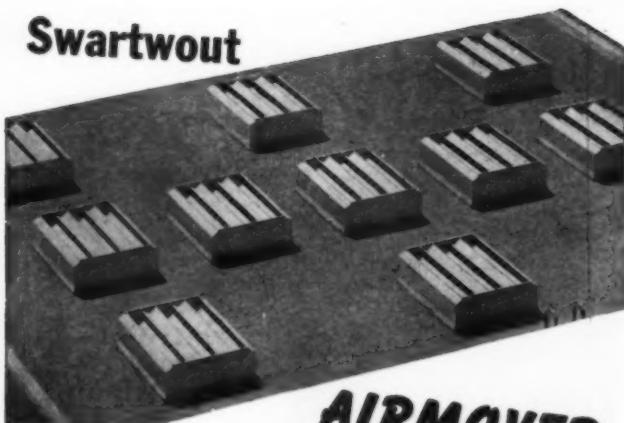


Venetian Blind Smartness!

FOR beauty and efficiency, Waterloo Series FH-100 Registers make an instant appeal to your customers. The horizontal multi-louvers provide straight flow or down flow of air through 90 degrees. Now, and post-war, you're ahead of the parade with Waterloo "registers of the future."

Waterloo REGISTER CO.
Established 1902
Waterloo, Iowa Seattle, Wash.

Swartwout



AIRMOVER

for high efficiency in roof ventilation without high ventilator construction

• This modern low-type ventilator (only 32" high) makes a hit with your customers—in appearance, in high air-flow capacity, in economical installation and

maintenance. The ideal ventilator for modernizing your factory and warehouse ventilation. Ask for details—

THE SWARTWOUT COMPANY
18511 Euclid Ave., Cleveland 12, Ohio



Specialists in Air Movement
by *Natural* Methods

IT SAWs!
IT FILES!



New

MULTI-PURPOSE TOOL
SAVES TIME — SAVES MONEY

* The Saw-Chief attaches to electric and air drills, or may be driven by flexible shaft. Hack-saw blade in holder reciprocates rapidly with a 7/8" stroke. Cuts all metals—every gauge, wood, plastics, other materials. Eliminates slow, tiresome hand-sawing operations. Reaches into hard-to-get-at places with ease. Insert ordinary machine file for power-filing operations. It's portable... carry it from job to job.

QUICK DELIVERIES ON AA-B PRIORITY OR BETTER

The Saw-Chief can be shipped quickly, ready for attaching to your drill or flexible shaft at only \$45.00. May also be obtained complete with heavy-duty drill at \$90.00, or with high-powered, light-weight drill at \$83.00.

Phone your jobber for demonstration today or write us direct?

ORDER SAW CHIEF TODAY

CHICAGO PRECISION EQUIPMENT CO.
919 N. MICHIGAN AVE., CHICAGO 11, ILL.

most experienced sportsmen's guides and timber cruisers mark "Black Equals North" on the back of their compass, and the best oil burner service men make up a check list and paste it inside the cover of their tool box.

Before completing an installation, inspection, or service job, they carefully check each item before leaving the job.

Typical Check List

The following is a sample of such a check list:

- 1—Inspect Heating Plant for carbon, rust, and scale.
- 2—Seal secondary air leaks.
- 3—Check flame CO₂ or better, Draft, and Stack temperature.
- 4—Nozzle or fuel jet, clean or replace.
- 5—Fuel filters—Clean or replace.
- 6—Oil leaks—repair.
- 7—Thermostat—test.
- 8—Stack switch—Protectorelay—Clean thermostatic element and shaft and test operation.
- 9—Limit control—test.
- 10—Fanswitch—test.
- 11—Hot water circulator—relay—test.
- 12—Oil pressure—check and adjust 90 to 125 pounds per sq. in.
- 13—Electric current 120 volt A.C. must not go below 90 volts with full load on oil burner circuit. Electric motors will not operate on less than 90 volts.
- 14—Motors—oil when needed.
- 15—Controls — look for loose connections, pitted points, soot and dirt.

In oil burner servicing, each service man will add to his tool kit from time to time, however, the following list will be sufficient to start with.

MASTER TEMPERATURE CONTROLS

*The Shape
of Things To Come*

Since very early in the war our facilities and practically our entire capacity have been used in the production of important electrical items for the Army and Navy.

Anticipating the termination of our war activities and recognizing the accumulated need for large production of better temperature controls, we have been busy improving our standard items and developing and testing new ones to meet the urgent demand of that new market.

We can't even tell you about these new things now, but when the green light flashes on, we believe you will be glad to share the opportunities represented by these better-than-ever Master controls.



WHITE MANUFACTURING CO.
2368 University Ave., St. Paul, Minn.

Testing Instruments:

- 1—CO₂ Flue Gas Analyzer.
- 2—Draft Gage.
- 3—Stack Thermometer.
- 4—Fuel Oil Pressure Gage, with fittings for $\frac{1}{8}$ " and $\frac{1}{4}$ " connections.
- 5—Graduated measuring glass.

Tools:

- 1—Trouble light and cord.
- 2—Test Light or Detecto-Lite.
- 3—Metal Mirror—with detachable adjustable handle.
- 4—Wrenches:
1—6" Crescent. 1—Stilson 6".
1—10" Crescent. 1—Stilson 10".
1—Set open end wrenches $\frac{1}{8}$ " to 1".
1—Set Allen wrenches $1/16$ " to $\frac{3}{8}$ ".
- 5—1 Set of Screw Drivers.
- 6—1 Set metal punches and cold chisels.
- 7—1 Ball and Peen Hammer.
- 8—1 Scratch Awl.
- 9—1 Oil Can.
- 10—Assortment of nozzles, fuses, gaskets, Ful-Flo filter cartridges, etc.

◆

Kruckman —

The National Budget

(Continued from page 49)

the nation. In effect we could then reach an approximately balanced Federal budget while our obligations via RFC might be higher than anything we have ever experienced.

**BE A
BLOWER
DEALER**

Clip this Ad



PLANNING AND
SELLING FILE

**Get
BOTH
Free**



BI-MONTHLY
MAGAZINE

Send this ad to us with your name and address on it and we will send you at no cost whatever the "Viking Planning and Selling File" and both past and present issues of "The Conditioner." With this important material you will learn how easy it is to sell Blower-Filter Units and to cash in on the amazing profits this field will produce for you after the war. Remember, the cream of the profits is on top now, just waiting for aggressive dealers like you to skim it off. Clip this ad and return it today.

VIKING AIR CONDITIONING CORP.
5600 WALWORTH AVE. • CLEVELAND, OHIO

Order from **PEERLESS**

• Your requirements for complete warm air heating needs—including Steel furnaces—*repair parts for all makes of furnaces and boilers*. Fittings, registers, blowers, asbestos paper, electric controls, etc. Orders will be filled as rapidly as present conditions will permit.

PEERLESS FOUNDRY COMPANY

1855 Ludlow Ave.

Indianapolis 7, Ind.



**SMALLER
STRONGER
HOUSING
WITH THIS NEW
*Randall***

**ONE-PIECE STEEL HOUSING
PILLOW BLOCK**

Streamlined for less resistance to the flow of air, this new, stronger pillow block maintains all the efficiency of the large single or double oil reservoir and the constant self-aligning features for which the Randall One-Piece Steel Housing Pillow Block has become famous.

By forming the housing around the spherical ball, a considerably reduced surface is exposed to the air stream and transverse strength is increased. Write for full details now, including Pillow Block Catalog No. 42.

RANDALL GRAPHITE PRODUCTS CORPORATION

Dept. 211 609 W. Lake Street Chicago 6, Illinois

YOUR BLOWER Requirements

AVAILABLE AT

Schwitzer-Cummins Company



★ BLOWERS FOR EVERY PURPOSE

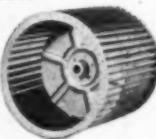
Double Inlet and Single Inlet



HY-DUTY Blowers, 9 1/4" to 25" • Top and Bottom Horizontal, and Top and Bottom Vertical Discharge • Top and Bottom

Motor Mounting • Dual Units also available.

★ CENTER DISC WHEEL—Double Inlet, Double Width • Reinforced Center Disc • Designed for Modern Air Conditioning and Heating Applications • Sizes, 4 1/2" to 50".



★ ENGINEERING DATA—Write for Catalogues showing complete Performance Data • Experienced Engineering Department available to help solve your Air Handling Problems.

BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
1145 EAST 22ND STREET INDIANAPOLIS, U. S. A.



To Help You
SPEED UP THE JOB

Lockformer machines do speed up the job amazingly. Lockformer 16, shown here, for example makes Pittsburgh locks, double seam locks, drive cleats, right angle flanges and 3/4" standing seam locks—in an astonishingly short time. More Lockformers are in use than all other makes of lock-rolling machines combined. Write or wire for complete information.

The **LOCKFORMER** *Co.*

4615 Arthington Street

Chicago 44, Illinois

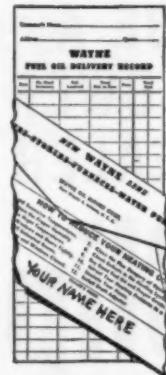
Those who are competent to judge insist that it is definitely the purpose to use RFC as the super-duper finance agency for vast government projects after the war. It is to be the colossal national investment bank, with numerous constituent parts in all parts of the country, to direct the allocation of this Federal capital. We are told by reliable sources that Jesse Jones operated the agency with two main objects: to make a profit for the government on the over-all, and to avoid brushing aside the private financiers. They cite the book to show that banks which borrowed RFC funds are almost wholly free from government control; debtor railroads have been given every possible opportunity to get out of hock; most of the private or public projects financed by RFC appear to have worked clear during the war.

The Jones-Wallace Argument

In the recent Senate hearings on the George Bill it was emphasized repeatedly that the deep cleavage between Jones and the New Deal group has been the Jones' faith in the idea that public moneys should be loaned only on the basis of strict banking criteria, while the New Dealers, including Wallace, insist the "only unbalanced budget is men out of work." They tell us here Jones has fought this doctrine for the past 12 years and that the present effort to install Wallace mainly was aimed at converting the almost unbelievably big RFC into a great machine to "finance full employment through an abundance of free and easy Federal credit." You get some idea of the limitless implications of RFC when you read what Jones said when they asked him in the Senate hearings if there was any limit on what he could lend. He an-

New! Convenient!
HEATING RECORD
CONTAINER
For Your Customers

FREE
TO ALL OIL BURNER
and FUEL OIL DEALERS



As illustrated—especially designed as a container for fuel oil ration coupons. Front has place for customer's name and ruled form for keeping a complete record of fuel oil purchases. Reverse side lists 12 points on how to save fuel and has place for dealer imprint.



A gift your customers will appreciate—and it's FREE—to help you build post-war business and to get profitable service and accessory sales now. ORDER TODAY. State number desired using your business letterhead.

WAYNE VICTORY HEATING MANUALS
They're FREE to all Oil Burner and Fuel Oil Dealers. Order your supply of these manuals now. State number needed using your business letterhead.

WAYNE OIL BURNER CO. 912 GLASGOW AVENUE
FT. WAYNE 4, INDIANA

WAYNE'S V-DAY LINE WILL BE COMPLETE

swered: "Any amount, any length of time, any rate of interest, to anybody that we feel is entitled to the loan." Senator Taft told the Senate that the powers lodged in Jones as head of RFC rivaled those of the President. Mr. Jones himself told the committee investigating the Wallace appointment that RFC is bigger "than General Motors and General Electric and Montgomery Ward and everything else put together."

The Powerful RFC

At the same hearing it took Senator George 45 minutes to read a summarized statement of the powers and activities of RFC and its subsidiaries. A complete list by names is almost impossible to obtain. New corporations appear suddenly and dormant ones reawaken over night. RFC is neither subject to the Budget Bureau for its annual budgetary needs nor to the General Accounting Office for its audit, as are all other Federal agencies. Why did such a vast grant of power ever come about? Each member of the Senate Commerce Committee went to exceeding pains to place on record that it was because Congress liked and trusted Jesse Jones. It gave him virtually unlimited discretionary power in his area of activity and made him the world's biggest banker with the utmost banking power ever exercised by any individual in the history of the world. It was hair-fine clear that the utmost scrutiny had shown he had never abused his power.

It is improbable any individual ever again will be given such power, because men of the giant stature and giant genius possessed by Jones seldom appear in history. Because he was loaded with these almost unthinkable powers, Jones himself, in 1940, when Roosevelt asked him to start buying tin, rubber and

The Improved FREDERICK STOKER

... DESIGNED to get every bit of heat from every ton of coal ...

We have been stoker specialists since 1918. The improved FREDERICK Stoker line is the foremost stoker value in America because

- ✓ the fully active grate surface
- ✓ continuous speed type transmission
- ✓ completely enclosed windboxes and mechanism PLUS other FREDERICK engineered features,* give maximum combustion efficiency with minimum service and maintenance—and result in lowered fuel consumption.

*Our Stoker catalog enumerates additional reasons why you should use FREDERICK Stokers. Send for your copy . . . today.



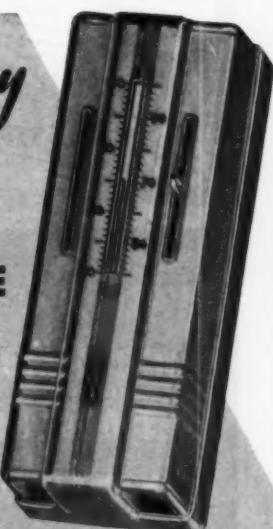
ALSO KEEP IN MIND

— for over 25 years FREDERICK has been making fine Centrifugal Pumps, guaranteed to meet the operating conditions for which they are sold. Write for full information.

THE *Frederick* IRON & STEEL CO.
Frederick, Maryland

STOKER SPECIALISTS SINCE 1918

IT'S Gleason-Avery FOR TROUBLE-FREE PERFORMANCE



• Popular G-A features include ease of installation and operation, positive safety and dependable service. The exclusive Straight Line Control, in the Gleason-Avery Damper Motor, provides smooth, accurate draft regulation. No sprockets or rotating arms to get out of order . . . no danger of overheating. Two-wire low voltage control. Finger-tip adjustment—synchronized settings—easier to set and read. Smartly styled G-A Thermostat finished in lustrous, durable Mirror-Lite.

You can recommend G-A Thermostats with confidence.

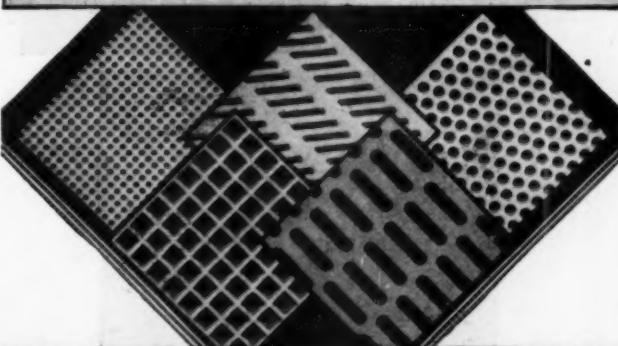
No. 130, Furnace Sentry Unit Package, for hand-fired, domestic heating plants, complete with thermostat, damper motor and all essential accessories—ready to install.

LIST PRICE \$19.50

Gleason-Avery, INC.
AUBURN, N.Y.

A RELIABLE NAME IN TEMPERATURE CONTROLS

PERFORATED METALS



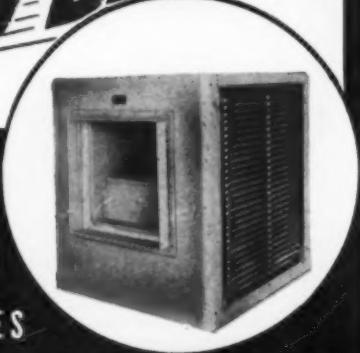
Any metal • Any perforation

H. & K. Perforated Metals are accurately made and embrace a great variety of perforations for use in screening, grading, ventilating and straining of different substances.

Tell us your requirements and we will send booklet showing actual sizes of perforations.

The **Harrington & King**
PERFORATING CO.
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SNO-BREEZE

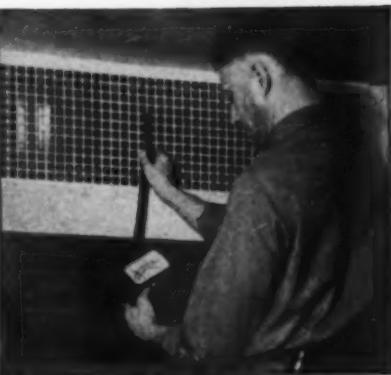


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Instantaneous, direct readings of air speed measured in feet per minute with the Alnor Velometer give you the quick, accurate information on air movement needed to check operation of blowers, fans, air conditioning installations, and similar equipment. No calculations, no timing, no conversion tables; read velocities direct from the Velometer scale. Extension jets permit accurate readings in many locations that would be completely inaccessible with other means of measurement.

The Velometer is made in several standard ranges from 20 fpm to 6,000 fpm, and up to 3 inches static or total pressure. Special ranges available as low as 10 fpm and up to 25,000 fpm velocity and 20 inches pressure.

Write for Bulletin No. 2448-E.

Illinois Testing Laboratories, Inc.

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other raw materials, asked Congress to make it law that all war acts of the RFC must be approved by the President. Senator George himself told the committee: "The powers of the RFC are too vast and too sweeping. Its economical and political controls simply cannot be estimated. I think we, as practical men, must know that if the incumbent were disposed to do so, if he wished to be a politician in this office, there is absolutely no way of measuring the consequences of his administration of it."

Nelson May Head Dept. of Commerce

The opinion of unsensational observers here is that the appointment of Wallace was even more devised to get rid of Jones than to give the job to Wallace. Those who should know say the President, personally, is not very warm towards Wallace. His letter asking Jones to quit is generally called the "kiss of death" for Wallace. His appointment was one of those things they say Roosevelt had to do, and his doing of it was just as unenthusiastic as his famous pre-convention endorsement of Wallace which gave the Vice Presidential nomination to Truman.

With the return of unemployment after the war it is expected the New Dealers will return to power in places that are unobtrusively being set up for them. The general impression here is that Marriner Eccles or some similar agreeable individual who will not oppose the giant-scale use of lending power will head RFC if Wallace finally is turned down. If Wallace also loses the appointment as Secretary of Commerce, it is felt in some knowing quarters that Commerce will go to Donald Nelson, now on the sidelines, also presumably entitled to a job commensurate with his

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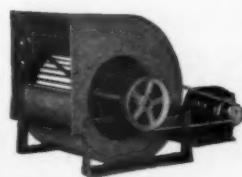
**ELECTRIC VACUUM
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1730 Ivanhoe Rd. • Cleveland, O.

prestige and ability. Nelson has high influence with Congress, is a sound business man, has become thoroughly grounded into the mechanics as well as the spirit of Washington Government operations, and is what the showman would call a "natural" for the job. The people of the Commerce Department have admired Jones and worked comfortably within the pattern of his program. They will probably welcome Nelson just as warmly, if not even more, because he is a man cut from their own cloth. He knows every broad phase of business and commerce and industry, and is regarded as an exceedingly good Government administrator.

Dept. of Commerce Is THE Bureau

It is generally assumed almost any new direction will mean the creation of a new over-all governance

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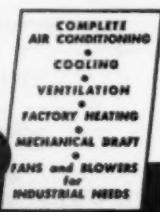
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SALL MOUNTAIN COMPANY
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of business after the war by Commerce Department. In addition to being an assembler and digester of statistics, it is expected to become the administrator of many business regulations now scattered through WPB, OPA, FEA, Department of Interior, Agriculture, State Department, Tariff Commission, and many other agencies. It is expected also to establish a Bureau of Industrial Economics capable of telling any one anything about the industry and commerce of the United States. They talk also about the creation of a series of committees or councils, each one specifically representing some particular industry or service, much like the present industry advisory committees in the war agencies but probably with more power and authority. These will head up into an over-all bureau which will function as a clearing house for the business community of the nation.

And somewhere along the line there will be a device by which all this Commerce activity will mesh with

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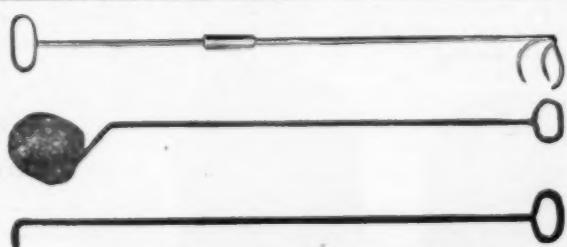
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"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes, as part of factory assembled units.

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ADAMS FIRING TOOLS
CLINKER TONGS
ASH REMOVERS
FIRING HOES
Buy Adams Known Quality
THE ADAMS COMPANY
BRIDGE STREET DUBUQUE, IOWA

AMERICAN ARTISAN, February, 1945

the machinery of the "compensatory" management program. The thought is that Maury Maverick and his Smaller War Plants Corporation will be incorporated in the Department of Commerce, and that either Maverick or some comparable personality of punch and vigor will represent Smaller Business, fight its battles, and make its loans. Over in Commerce the thought seems to be that business loans, with RFC cooperation, may be based upon the philosophy that is the foundation of the Federal Housing Administration. Private loans will be insured and the system will enable the banks of the nation to become a participant in the new system.

Persuasion—Not Orders

It may interest you to know that the New Dealers use every possible persuasion to convince you that they no longer believe in government ownership and

FOR BETTER HEATING...



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The sturdy iron chassis, amply reinforced and braced to provide four side floor rest and positive rigidity of blower is another Brundage feature of quality . . . a feature that gives positive assurance of quiet operation and long life.

Above cut-away shows simplicity of Brundage design and construction . . . front panel and filters removed to show accessibility. Sound engineering and quality production is a Brundage guarantee to jobbers, furnace manufacturers and dealers.

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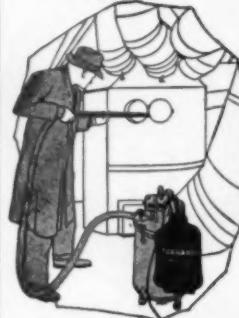
Formerly made by Monmouth Products Co.
Now produced by

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operation, but are convinced that private management and private enterprise is essential to the future welfare of the nation, meshed into the "National Production and Employment Program" of the Murray Bill. They stress that the orders of war time administration will be replaced by suggestions, counsel, and persuasion. Apparently they wish you to feel that you may cut your own cloth, always within the "compensatory management" plan. It all is rather bewildering and confusing and does not mortise consistently. When we lean back and think it over we are rather inclined to think of that old line: "Methinks, he protesteth too much." Perhaps there are some New Dealers who really do not like the radical trend, and that there are others who still like to go well over to the left; and that this curious wedding of incompatible ideas is a genuine effort to compromise. MAYBE.

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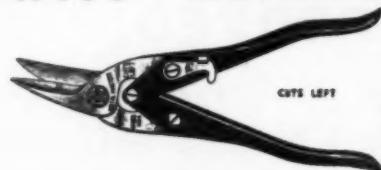


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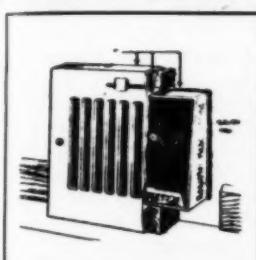
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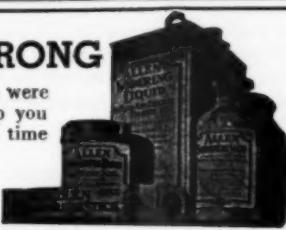
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Roll Forming Machines
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BUILT TO DO YOUR JOBS

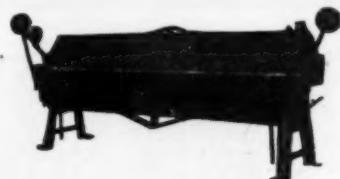
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Throatless shears that
cut any shape . . .
straight, circular or Ir-
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No. 1 for 14 gauge.
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mild steel and 10 gauge
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Furnace Fan Control is so easy to adjust, and at the same time the accurately calibrated dial shows exactly what you want to see in making the adjustment. The same thing is true of the M-41 Warm Air Furnace Limit Control.

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Gas-Fired
FLOOR FURNACES

Will again
be on the market after it's over, but
now it's war work.

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WAR TIME

Late in December of 1944, the L. J. Mueller Furnace Company of Milwaukee was visited by three U. S. Army Tank Corps veterans of both the Mediterranean and European Theaters of War, all of whom were wounded in action. They were 1st Lieut. Gordon Crowder, who is now assigned to the Chicago Ordnance District; Pfc. Burbridge and Staff Sgt. Gilbertson. The purpose of their visit was to talk with production employees in an effort to emphasize the extreme need for more Army Ordnance Materials and to spur the workers on to greater production.

The Mueller Furnace Company has been manufacturing Track Links for tanks, half tracks, and other prime movers for the Army Ordnance Department, and coincidental with the visit of those three veterans, the two millionth tank track link rolled off the production line. These two million links are sufficient to equip 12,658 M-4 General Sherman Tanks.

A large brazing furnace consumes approximately 1 1/4 million cubic feet of gas per month to provide a protective and neutral atmosphere necessary for the brazing of tank track links.

Alex R. Benson Company, Hudson, N. Y., manufacturers of Yager's soldering fluxes, sell to jobbers mostly, but 95 per cent of their sales carry AA1 priorities. Sons of President L. R. Benson are in service:

Lt. Lloyd G. Benson is in command of a destroyer-transport in the South Pacific area; most recent action on Ormoc Bay, Leyte.

Major Alex R. Benson, USMC, four months on Guadalcanal at the first landings.

Today, with our country at war, the C. J. Tagliabue Division, Park & Nostrand Aves., Brooklyn 5, N. Y., as well as every other Division of Portable Products Corporation, is exerting every effort to produce more and better products to bring about a speedy victory. At the close of the war, Portable Products Corporation, backed by the many years of research and development of its various divisions, will manufacture and distribute its products in an effort to bring greater comfort to the new world of peace.

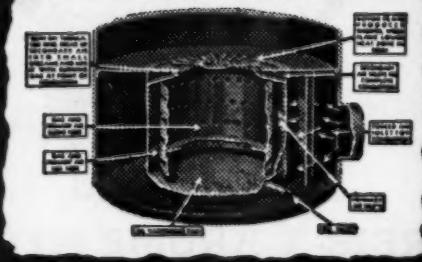
Employees of Skilsaw, Inc., Chicago, manufacturers of portable electric tools, have received for the fourth time the Army-Navy Production Award for high achievement in the production of war materials. This fourth citation, received January 6th from Under Secretary of War Robert P. Patterson, adds a third white star to the company's "E" Flag as a symbol of continued achievement in producing materials essential to the war effort.

F. W. Dwyer Manufacturing Co., 565 W. Washington St., Chicago, is engaged about 95 per cent on war orders. Three former employees have seen action thus far.—F. W. Dwyer.

Famous Patented **Monogram** Vaporizing & Provides Highest Known Operating Efficiency with

Full Forced
Winter Air
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•
Booster
Gravity
Units



The QUINCY STOVE MFG. COMPANY, Quincy, Ill.

TRADE NEWS



Armstrong Cork Company, Lancaster, Pa., has recently issued a booklet describing their war activities. A non-metal working organization, Armstrong has departed from its normal type of manufacturing in order to produce steel shells, cartridge cases, magnesium incendiary bombs, steel and aluminum aircraft parts and assemblies and other materials of war.

By adapting equipment normally used in making floor covering, the company became one of the nation's largest producers of camouflage of the wire netting type. In addition, millions of yards of shrimp-net camouflage were proc-
essed.

Another operation involving conversion of existing equipment was the coating of Army duct to be used for tents and tarpaulins, with a fireproofing and moistureproofing compound developed in the company's own laboratories.

Nearly all of the thousands of gauges, dies, jigs and fixtures needed for the munitions production lines were produced in the company's own engineering shops, which also carried out numerous small sub-contracts for tank and gun-mount parts.

The Army-Navy "E" was formally presented to the Lancaster plants on November 30, 1942. A White Star indicating continuing excellence was awarded in June, 1943, and a second in January, 1944.

The Voice of Emerson for January 24, published in the interests of the members of the Emerson family by The Emerson Electric Manufacturing Co., St. Louis 21, Missouri, contains an illustrated story of air compressors to increase the efficiency of B-29s which will soon go into production at both the Electrical and Turret Divisions.

One section entitled "The GI Voice" is a regular feature and exists for the exchange of information from and about Emerson members now in the service—Excerpts from letters, news and photographs.

Award of the coveted Army-Navy "E" to the Farr Company, manufacturers of Far-Air air filters, Los Angeles, has been announced by the Western District headquarters of the Air Technical Service Command.

War production activities have been concerned chiefly with the manufacture of Farr Carburetor Air Filters for airplanes. The filtering element is of herringbone crimped wire screen.

In connection with the award it was announced that in three years production had tripled.

Round Oak Company, Dowagiac, Michigan, is heavily engaged in the production of war materials, and has underway a large scale plant improvement program which is progressing as rapidly as conditions permit.

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FURNACES
FOR STOKERS

OIL or HANDFIRE
50,000 to 200,000 BTU's
Patented Damper
Uses All the Heat
in the Added Heating Surface
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TO SELL

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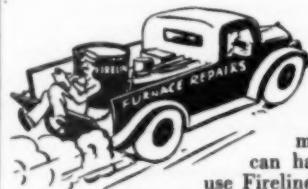
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WHEN you do have to repair Vernois furnaces (which isn't very often) always use original Vernois repair parts! They are made of the same high quality workmanship and materials as Vernois furnaces themselves. Insist upon Vernois parts . . . order them direct from us.

MT. VERNON FURNACE & MFG. CO.

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Keep FIRELINE on the truck!

These days, when all furnace men have more work than they can handle, it's just good business to use Fireline. No long waits for firepot castings when you use Fireline. It repairs any furnace job, big or small. Seals all cracks and holes . . . Salvages burned-out firepots . . . Protects and preserves good castings with its durable, heat-saving refractory lining. Quickly installed. Job-for-job, your profit is greater with Fireline. Write for bulletins, prices, and name of nearest jobber.

Also ask about IRONSET Furnace Cement

FIRELINE STOVE & FURNACE LINING CO.

1816 Kingsbury Street, Chicago 14, Illinois

HEIL IS THE NAME TO REMEMBER
for oil burners . . . oil-designed
furnaces and boilers that assure you of:

- ✓ Satisfied, loyal customers
- ✓ Minimum service trouble
- ✓ Efficient, economical operation
- ✓ Design features that sell
- ✓ Profitable manufacturer-dealer relations



THE HEIL CO.
GENERAL OFFICES: MILWAUKEE, WISCONSIN

**MOVE 30% MORE AIR
at less power cost!**



Here's a new idea that revolutionizes ventilating . . . the Air-Van Power Exhauster moves 30% more air at less power cost!

Accepted everywhere for its phenomenal performance, superior design and splendid construction, the Air-Van Power Exhauster is your answer to all ventilating problems! Write for complete details today.

THE GALLAHER COMPANY
OWATONNA, MINNESOTA

ELATERITE . . .

MODERN NAME FOR ANCIENT PLASTIC ROOFING SECRET

Elaterite roofing is the modernized formula of the ancient Egyptians . . . Elaterite gives you the same time and weather defying protection for roofs which have preserved the ancient monuments through the centuries.

Plastic and workable, Elaterite does not dry rot, crack nor break. Will not run or "alligator" on the steepest, hottest roof. Write for a sample of Elaterite, the ancient plastic secret brought up to date today!

ELATERITE PLASTIC PRODUCTS

205 6th Street, N.W.

Canton 2, Ohio

Bremil
Two Sizes
PORTABLE SHEARS

Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line.

ALL-ALLOY No. 2 cuts up to $\frac{1}{4}$ " steel plate.

ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.

BREMIL MFG. CO., ERIE, PA.

AMERICAN ARTISAN

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Classified

FOR SALE

UNIVERSAL TOOLS

Immediate Delivery

Pipe Wrench
Channellock Pliers
Adjustable Wrench
CooTee Pliers
Diagonal Cutters
Hammer
Screwdriver
Vise-Grips
Hacksaw
Cold Chisel

**\$19.85
10 Pcs. Set**

Remit with Order. Catalogue Free with First Order. Remember: We have it—Can get it—or it isn't made. Mail your order Today!!

DEALERS TOOL SUPPLY
1527 Grand H.P., Kansas City, Mo.

FOR SALE: A highly successful Blower Company in central Connecticut, established 36 years specializing in blower systems, dust collecting systems, ventilating systems, conveying systems, roof ventilators, blowers, exhaust fans, industrial vacuum cleaning systems, portable vacuum cleaners, air filters, dust collectors, Special sheet metal work for industrial plants. Valuable new inventions for post war manufacture. Shop equipment, tools, machines, stock, office equipment, drawings, patterns, name good will, present and prospective customers. \$2500 cash required, balance \$225.00 per month over a period of five years. Aged owner wishes to retire on account of a serious physical handicap. Address Key No. 594, American Artisan, 6 No. Michigan Ave., Chicago 2, Illinois.

FOR SALE
1—Eight Foot Wooden Double Truss Cornice Brake for 26 Gauge and lighter—a
BARGAIN
HOWARD SWANGER COMPANY
MARION, INDIANA

NO WAIT—NO PRIORITY

BEADERS: NO. 4 NIA, 24 ga. 6" Thr.

BAR FOLDERS: HAND—30" & 20" NIA:

PEXTO: 60" NIA. COMB. FOLDER

& BRAKE.

PIPE FOLDERS: 60" NIAGARA

POWER: 45° & 30° HAND.

CAN MACHY: NO. 150 TORRISWOLD

HORIZONTAL AUTO. BOTTOM

SEAMER; NO. 22 CAMERON POW-

ER SQUEEZER & FLANGER.

DRILLS: 34" BARNES; 25" SNYDER

UPRIGHT; 24" BARNES; No. 12 & 14

NATCO Multiple; 8 sp. FOX: 2, 3 & 4

sp. AVEY; PATTERSON speed.

**NEW 14" x 6" LYON-ROBBINS,
GEARED HEAD TOOL ROOM
LATHE.** No priority Required. Immediate delivery.

LATHES: 18" x 8" AMERICAN, 18" x 12" LODGE & SHIPLEY, 17" x 8" Eng-
ine, 17" x 6" CINCINNATI, 18" x 6"

These are but a few of the machines available in our large and diversified stock. Let us help you with your engineering problems—We solicit your inquiries for machines to do your war and post-war work.

INTERSTATE Machinery Co., Inc. **Yards 5800**

1433 W. Pershing Rd., Chicago 9, Ill.

**LODGE & SHIPLEY, 16" x 6' PRATT
& WHITNEY, 14" x 6' BRADFORD,
14" x 6' LODGE & SHIPLEY, 14" x 4'
LODGE & SHIPLEY.**

ROLLS, ANGLE: 6 x 6 x 6 $\frac{1}{2}$ " WICKES,
Triple Back Grd.: **LEVELLER:** 6'
NILES, 63" rolls, 6 $\frac{1}{2}$ " dia., 54"
MCKAY, ROLLER; 48" x 10' GLOBE
HYD.

SHEARS, SQUARING: 8' 16 ga. POWER
SQUARE; No. 1125 NIA, 12" MORGAN
4" cap. **ROTARY:** No. 6 QUICK-
WORK, 1" cap. 48" thr.; 14 ga. YO-
DER, 60" thr.; **SHEAR & CIRCLE:**
QUICKWORK CIRCLE, 36" throat,
5/32" cap.; **SLITTING:** 225A BLISS
GANG.

SPOT WELDERS: 250 KW FEDERAL
PRESS TYPE; 25 KVA THOMSON;
20 KVA GIBB PRESS TYPE; 10 KVA,
15 KVA A.E.F.; 10 KW FEDERAL,
30 KW CREAM CITY, 10 KVA TAY-
LOR-WINFIELD.

Better for Every Spraying Purpose

MARLEY SPRAY NOZZLES

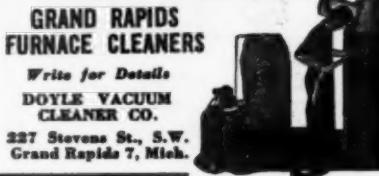


MARLEY CO., INC. Write for Literature Now!
Kansas City, Kansas

GRAND RAPIDS FURNACE CLEANERS

**DOYLE VACUUM
CLEANER CO.**

227 Stevens St., S.W.
Grand Rapids 7, Mich.



Keep
Buying
WAR
BONDS

SMITH'S CLEAT BENDERS

THE COMPLETE DRIVE CLEATING MACHINE
SAVES MORE TIME per joint of pipe,
over ordinary hand methods, than any
other machine used on square pipe work
... and it is **USABLE MORE OFTEN**

per job, because it
edges the pipe
and makes drive
cleats to join them
together.

NOW TWO SIZES

NO. 12
Takes All Sizes Up
to 12"

NO. 18
Takes All Sizes Up
to 18"

Write for More
Information.

R. E. SMITH 1513 MONROE,
WAUKEGAN, ILL.

Drill Concrete the Easy Way



WODACK "DO-ALL" ELECTRIC HAMMER AND DRILL

Saves time and money installing expansion anchors. Drills concrete to 1 $\frac{1}{2}$ " dia.; metal to $\frac{3}{4}$ ". Two tools in one. Easy to maintain. Universal motor. Star drills in 17 diameters. Also chisels, bull points, etc. Write for bulletin No. 644.

Wodack Electric Tool Corporation
4627 W. Huron St. Chicago 44, Ill.
Telephone AUSTIN 9866

Trademark
YAGER'S Soldering Salts—Past

Two standard fluxes for all soft soldering. Safe,
quick, certain. Buy them at your Jobbers or write
us if he cannot supply you.

$\frac{1}{2}$ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.

LEX. R. BENSON CO., INC., HUDSON, N.Y.

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Strip
Flats
Squares
Angles
Rounds
Channels

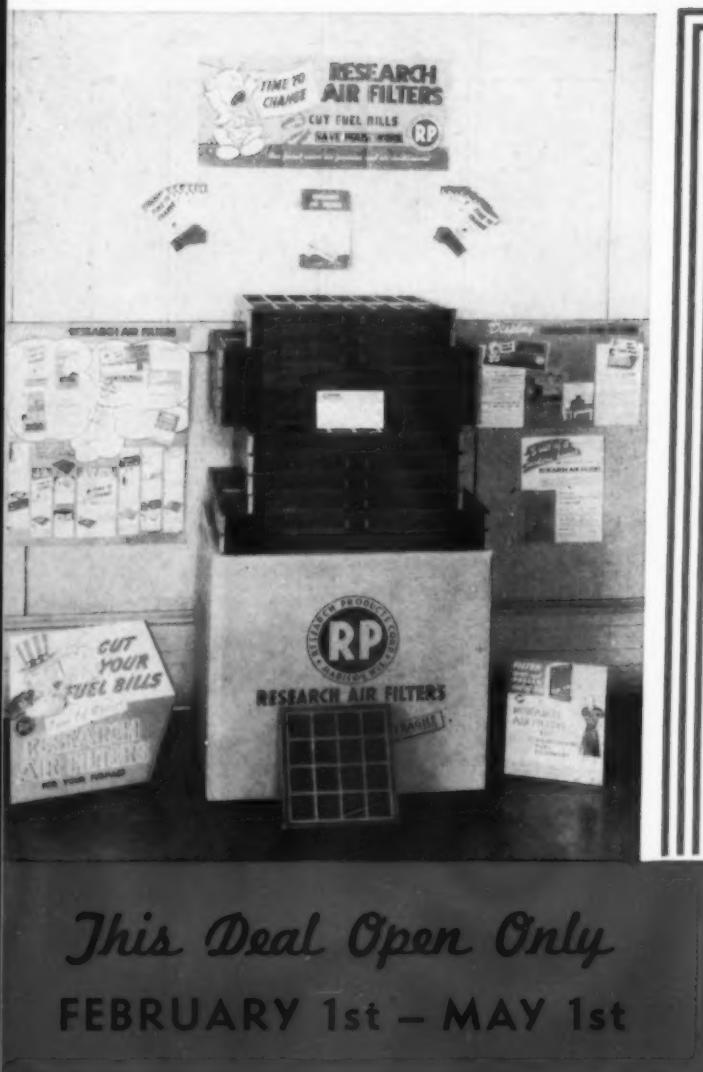


Steel Service For Bars

More advantages for you

Many hundreds of Midwest buyers rely on Wolff for bars for two good reasons. Reason No. 1 is quality. All stock is arrow straight, clean, with a tight adhering scale, made by outstanding mill sources, and backed by chemical analysis that can be furnished on request. Reason No. 2 is Wolff Service. It's not the ordinary garden variety of take-it-or-leave-it service you've come to expect from ordinary sources of supply. Rather, Wolff Service is based on the complete, co-ordinated cooperation of everyone from the time your order is received, through any required cutting, sawing or galvanizing of stock. It's the kind of service that gets things done for you and gets them done right, so that you can do your work better and faster. Call Wolff for bar stock.

BENJAMIN WOLFF & COMPANY
58th St. at Seeley Ave. Chicago, 36 Ill.



LONG-PROFIT DEAL ON RESEARCH AIR FILTERS

ONLY \$12.20 FOR THIS "FILTER DEPARTMENT"

Almost 50% Profit!

An assortment of sizes that will fit 9 out of 10 furnaces in your area.

A business that brings certain repeat trade because continued advertising on the fuel-saving, working value of air filters.

This display assortment has proven its power in pre after store. Put it to work for you! Repeat orders should be for filters only, packed in standard cartons of one dozen, two-inch filters, as your trade requires.

Here's The Deal . . .

Quantity	Size	Dealer Cost	Retail Price	Dealer Profit
2	20x25x2"	2.30	3.30	1.00
4	20x20x2"	4.00	6.00	2.00
4	16x25x2"	4.00	6.00	2.00
2	16x20x2"	1.90	2.80	.90
—		12.20	18.10	5.90

10"x10" sample Research Air Filter for counter display demonstration! Filter "size book" allowing you to scribe proper size filter! Window and counter display units! Consumer folders, newspaper mats, blotter and envelope stuffers also available.

free!

RESEARCH PRODUCTS CORPORATION
Madison 3, Wisconsin